MINING WORLD

in this issue

J&L's Star Lake Martite Mill

Page 38

JUNE 1953

Vol. 15 No. 7

35 cents a copy
In sterling 3s

DEVELOPMENT WORK
is done most economically with Eimcos. Two rounds per shift are easily completed on many small contract jobs using a minimum crew
EIMCO
THE EIMCO CORPORATION
The World's Largest Manufacturers of Underground Rock Loading Machines
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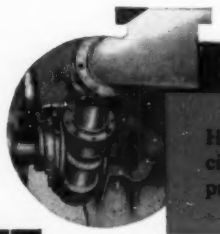
These pumps sell themselves

Our sales records for 1952 show that of the hundreds of Hydroseal Pumps sold, 73% were bought by companies that already had Hydroseal experience. They didn't buy a "pump in a poke", but made their selection on the basis of substantial savings in other operations. Check through this list, and you'll see why Hydroseals are their own best salesmen.

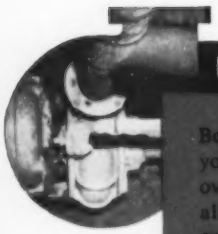
EASY MAINTENANCE

All Maximix Rubber Parts are moulded to shape and are mechanically locked into proper position without cementing or vulcanizing. Your own men can make repairs quickly in the field.



EXTREME FLEXIBILITY

Hydroseals will operate efficiently under both nigh inlet pressures and high suction lifts.



POWER SAVINGS

Because efficiency is maintained, you don't need to install an oversize pump and motor to allow for wear. Thus power costs are reduced by ⅓ to ½.

LONG LIFE

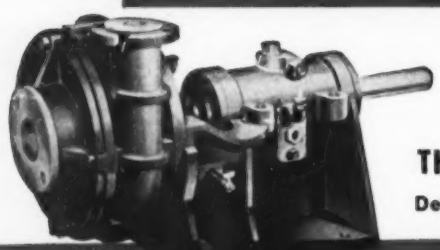
Million-ton-plus records are not unusual, without maintenance, and with no appreciable loss in efficiency, capacity, or head.

HIGH EFFICIENCY

Clear sealing water protects close clearances from abrasive wear. Initial high efficiencies are maintained throughout pump life. No adjustments, take-up, speed changes, etc., are needed.

LOW COST PARTS

Maximix Rubber Parts cost less than equivalent metal parts, are 80% lighter, and thus easier to handle and cheaper to ship.



Get more details on why Hydroseals are the first choice of milling engineers. Write for Catalog No. 552 today.

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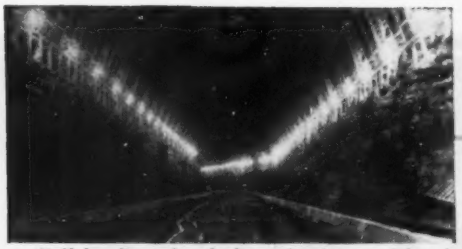
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.

Representatives throughout the World

HYDROSEAL

SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

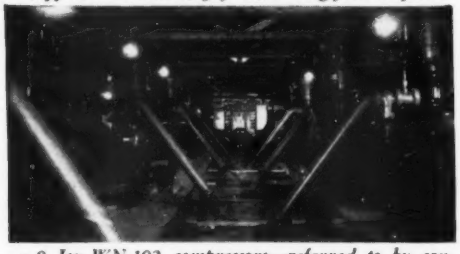
HYDROSEAL, PACKLESS AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD



Full heading after both top heading and bench have been excavated. Excavated dia.—51 ft.

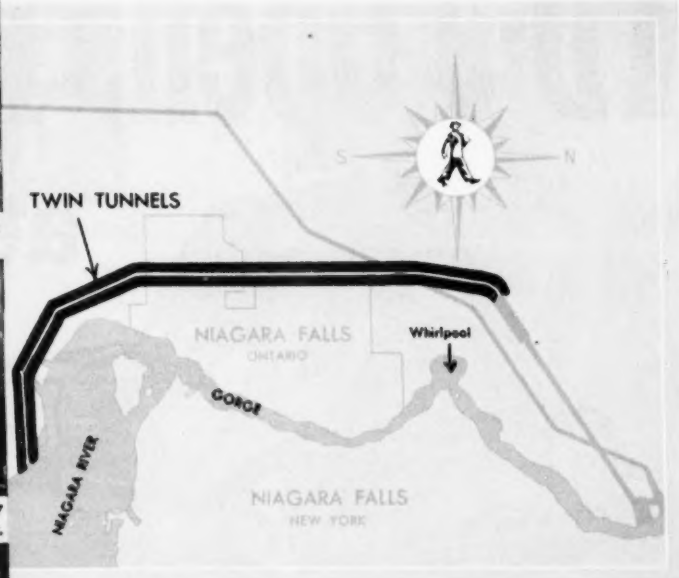
Main Jumbo for driving top heading—mounts 17 T-350 long-feed drifters on Joy Hydro Drill Jibs.

Jumbo for bench drilling—suspended from roof supports—mounts 13 Joy T-350 long feed drifters.



8 Joy WN-102 compressors—referred to by contractor as "ultimate in compressor usage."

Series 1000 Axivane Fans in ventilation arrangement. Tracks permit adding fans as desired.



PROGRESS REPORT ON THE WORLD'S LARGEST TUNNEL

SIZE: **Twin Tunnels 51′ Dia., 5½ mi. length.**

LOCATION: **Niagara Falls, Ontario.**

EQUIPMENT USED **(All Joy Installation):**

114 T-350 Drifters on LW-6A Feeds on Hydro Drill Jibs.
24 WN-102 Semi-Portable Air Compressors.
Series 1000 Axivane Fans—added as needed to maintain air volume.

The world's largest tunnel is being bored out of *solid rock* with the help of Joy rock-drilling equipment, ventilating fans and air compressors.

4,375,000 cu. yds. (9,923,000 tons) of rock will be excavated to form the huge twin tunnels. These 5½ mile tunnels will convey water from the upper Niagara River beneath the city of Niagara Falls, Ontario, to a point near the Whirlpool Rapids, well below the Falls. Water thus diverted for hydro-electric power purposes would supply the water needs of 200 million people!

This is the first large tunnel operation where drilling has been mechanized. The "All Joy Equipment" installation confirms Joy's position as leader in the heavy construction and tunneling equipment market. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

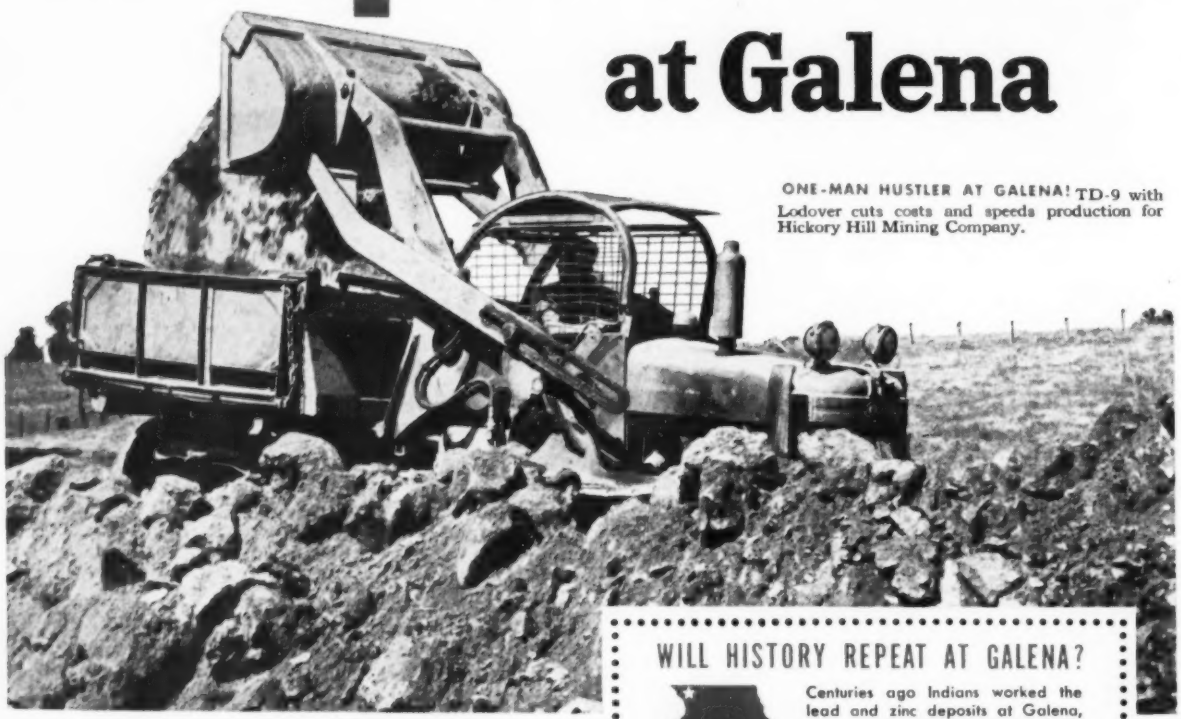
Consult a Joy Engineer

W&D C-4587

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

TD-9 Opens New Mine at Galena



ONE-MAN HUSTLER AT GALENA! TD-9 with Lodover cuts costs and speeds production for Hickory Hill Mining Company.

International crawler brings speed and economy to revival of historic lead mining area

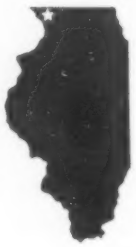
When Hickory Hill Mining Company opened a new lead and zinc mine recently near Galena, Illinois, they rolled back history 300 years. French explorers first heard about lead deposits in the region as early as 1658.

But those adventurers of long ago never saw anything like the production methods now in use in this historic field.

Underground at Hickory Hill's workings, for example, an International TD-9 with Lodover operates with speed and economy. At present, this one-man unit loads about 100 tons a day, and the owners expect to step it up to 150 tons a day.

With the Lodover shown in the picture, the TD-9 loads trucks—builds roads, levels rock and handles other jobs where its fast maneuverability and low operating costs are assets.

WILL HISTORY REPEAT AT GALENA?



Centuries ago Indians worked the lead and zinc deposits at Galena, Illinois, using the red ore for war paint.

First licensed mine in the area opened in 1822. Galena boomed. By 1826 it was bigger than the Chicago of that day and became the richest town in Illinois. But the boom burst. For 100 years the Galena mines were dormant.

Now, comes the revival, with new methods, new efficiency, and new profits for enterprising operators.

Speaking of costs:

"The tractor and Lodover downtime has been an absolute minimum for the work it is doing," says William Peart, superintendent and one of the partners in Hickory Hill Mining Company. *"The unit has fast production and long life. We are well satisfied."*

That's one of the big things about International power—the satisfaction it delivers, along with unmatched speed and economy. See your International Industrial Distributor for details on International's complete line of crawlers. Pick your size and put "Power that Pays" to work for you.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL INTERNATIONAL HARVESTER **POWER THAT PAYS**

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THE COVER CIRCLE: This spiral on the rod mill discharge at Jones & Laughlin's magnetite-martite mill at Star Lake, New York is one of many practical money-saving devices in the mill. The spiral ejects pieces of oversize, which formerly stayed on grate and wore it out. Grate life has been more than doubled. Turn to page 38 for illustrations of seven other made-on-the-job money-saving devices.

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WORLD MINING is published the 26th of each month as a regular department of **MINING WORLD** and is also circulated as a separate publication on a carefully controlled free basis to a selected list of management and supervisory personnel associated with active mining enterprises throughout the world.

Removing a four-foot core from the corebarrel of a Sprague & Henwood contract drilling rig at an iron ore property in Northern New York.

Good Cores
from ANY formation

The efficient organization and equipment developed during more than sixty years of successful world-wide experience in contract diamond drilling enable us to obtain a high percentage of core from any rock or ore formation. Unfavorable conditions are overcome, in many cases, through the use of special tools developed by our own engineers and manufactured in our own extensive shops.

Besides all types of exploratory drilling for coal and ore, our service includes foundation testing and pressure grouting. Experienced crews and supervisors are available for service anywhere in the United States and most foreign countries. Estimates submitted on request.

The same high-speed drilling machines, improved diamond bits and complete accessory equipment used by our own crews are available to other diamond drill operators. Write for Bulletin 320 and tell us about your operating conditions. Our experienced executives welcome opportunities to make money-saving suggestions.

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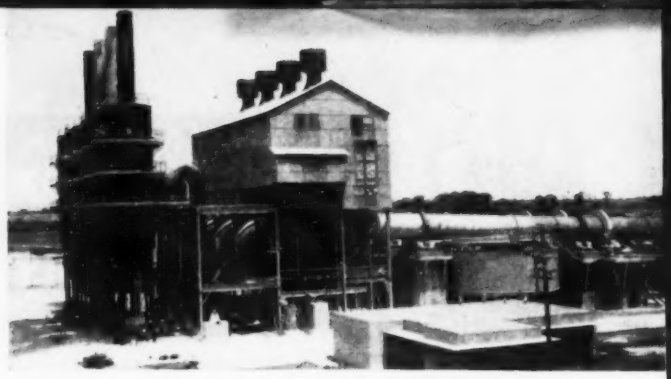
See our 4 page insert in McGraw-Hill Mining Catalog

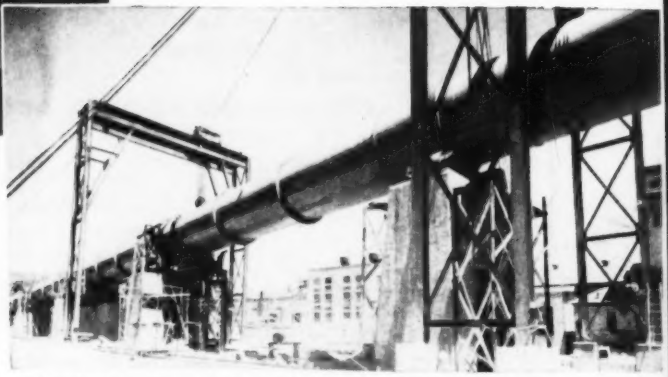
There's safety in numbers

Traylor



Baton Rouge, La. - 3 of 4 9'6" x 250'0" Traylor Kilns installed in the plant of a leading Cement Producer.

HAS BUILT 40 Rotary Kilns DURING THE PAST 2 YEARS



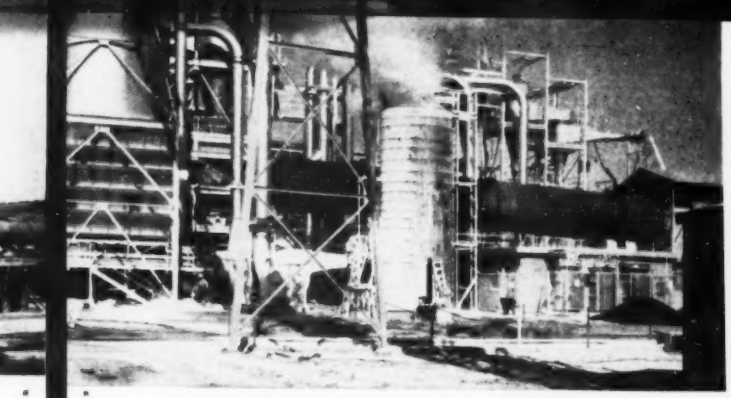
Covington, Va. - 11'0" x 350'0" Lime Kiln purchased by another leading paper maker for lime sludge recovery.

Palatka, Fla. - 7'0" x 200'0" Kiln in the plant of a paper manufacturer, used for lime sludge recovery.

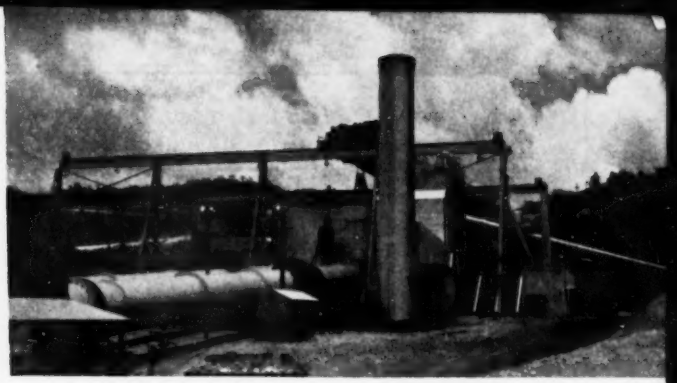
Each Kiln individually "Traylored" for the efficient production of one of the following 13 different products.

Lime • Titanium Oxide • Bauxite • Cement • Sodium Silicate Dolomite • Iron Sulphide • Alumina • Sinter-Alumina • Calcium Chromate • Phosphate Rock • Lime Sludge • Diatomaceous Earth

A rotary kiln represents an important investment for any company. Leading producers all over the world have come to rely on Traylor's past experience to avoid future production headaches. Play it safe. Depend on the proven ability of Traylor engineers to assure the production you anticipate when expanding or modernizing your plant facilities.



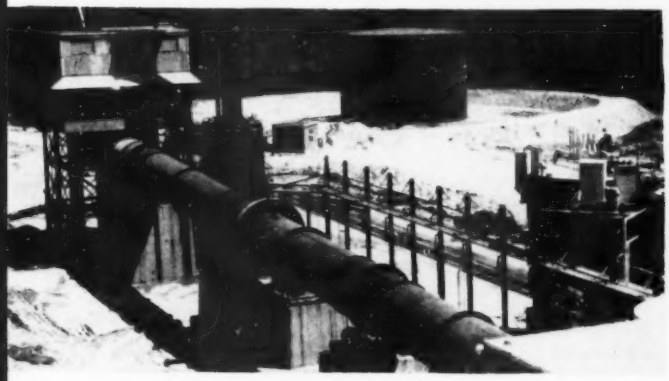
Lompoc, Calif. - An 11'0" x 100'0" Kiln producing Diatomaceous Earth.

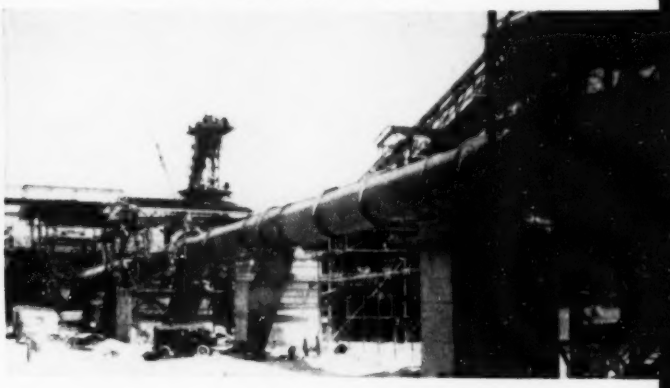


Jamaica, B.W.I. - 9'0" x 175'0" Traylor Kiln used in the processing of Bauxite.

Acme, N.C. - Traylor 8'6" x 215'0" Lime Sludge Recovery Kiln in plant of well known paper manufacturer.

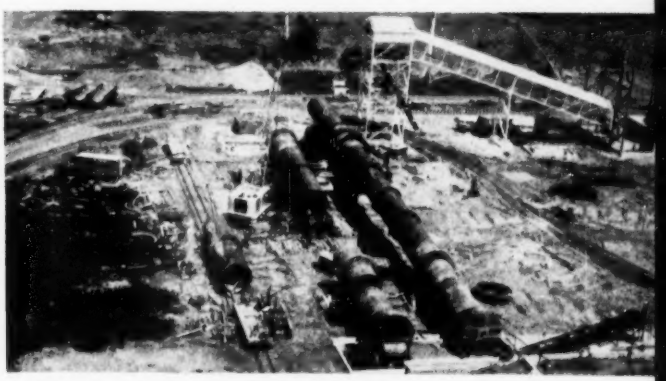
Chile, S.A. - 7'6" x 315'0" for calcining lime, used in the processing of copper ore.





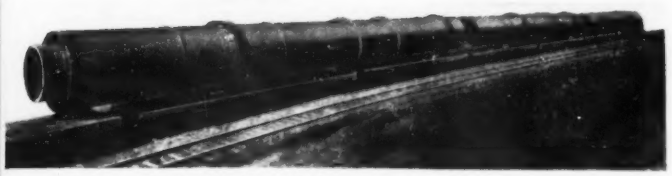
ranging in size from 7' diameter up to 11' diameter x 400' long

Gardanne, France - 9'6" x 250'0" Rotary Kiln installed in the modern alumina plant of a well known overseas company.



Suriname, S.A. - Two of many Traylor Kilns installed in Latin America these 8'0" x 120'0" kilns will be used in the production of Alumina

A **Traylor** *Leads to Greater Profits*



York, Pa. - It took 7 flat cars to ship this 10' x 300', 3 section Traylor Kiln to this leading Dolomite producer.

Soon to be released! A new, fully illustrated, bulletin on Traylor Rotary Kilns is now in preparation. It will show the many superior features of Traylor Rotary Kiln design in detail. Mail the coupon today to be sure of getting up-to-date information you can't afford to miss.

Name: _____

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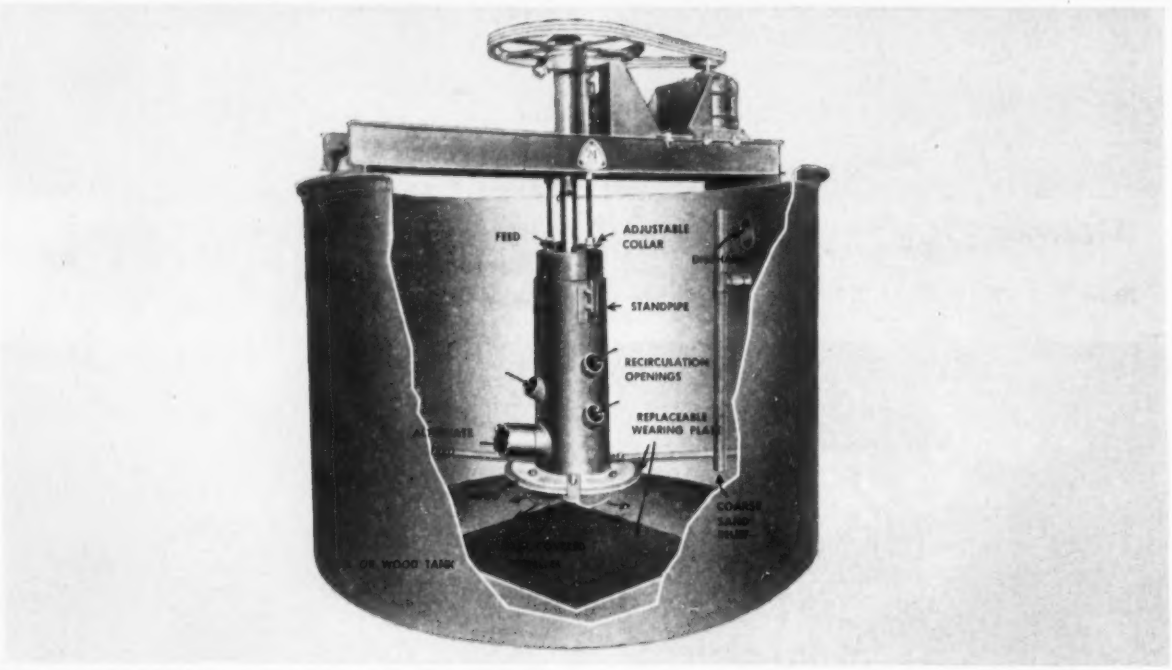

This cutaway photograph shows clearly how complete, high efficiency conditioning is possible in Denver (Patented) Super Agitators and Conditioners. All feed and recirculated pulp is accurately controlled through the Patented Standpipe and goes directly into the intense agitation zone of the propeller.

Conditioning Is Thorough, Short Circuiting Is Eliminated By Patented Standpipe In Denver Super Agitators

Flotation recovery and profits increase substantially when pulp is conditioned thoroughly—each pulp particle must be intimately mixed with reagents. Denver Super Agitators and Conditioners give you this necessary, thorough conditioning because of the patented standpipe feature.

All feed must pass down the standpipe and directly through the intense agitation zone of the propeller. You get positive conditioning that completely eliminates the short circuiting found in open propeller types. This positive, intense agitation gives you the high conditioning efficiency essential for maximum flotation results and profits.

PATENTED STANDPIPE

Feed enters the standpipe either through the top, or through an alternate feed inlet in the lower end of the standpipe. (The low, alternate feed inlet permits feeding the pulp from one conditioner to another, on the same level, without pumps.) Pulp is positively and accurately recirculated by adjusting the patented weir collar around the top of the standpipe or through adjustable recirculation openings on the outside of the standpipe. Thus all feed and recirculated pulp goes from the standpipe directly through the propeller zone.

NO SAND-UP ON SHUTDOWNS

A patented, replaceable Decolloy hood on the bottom of the standpipe, directly over the propeller, improves agitation efficiency and prevents sand from settling around the propeller on shutdowns. All enclosed, heavy-duty, anti-friction bearing shaft assembly gives long service. Motor drive and mechanism are mounted on ridged, beam type superstructure. Sizes from 3′x3′ to 20′x20′

Write or wire today. Find out how more complete conditioning of your coarse, high specific gravity flotation pulps will increase flotation recovery and profits — when you use a Denver Patented Super Agitator and Conditioner.

Free Technical Bulletin Sent on Request

Over 25 years of Flotation Engineering

DENVER EQUIPMENT COMPANY

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3 speed drum hoist with cable
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for UNDERGROUND DRILLING
The Choice of Drill Operators for Dependability and Economy.
...Cores Tell The Story
ECONOMY PLUS ADAPTABILITY for underground exploration, either long or short holes, makes the Wolverine highly preferred among the many core drill models manufactured by Longyear. It has abundant power for long holes up to 800 feet in depth. Exceptionally light weight and ease of handling make the Wolverine extremely practical for short core drill holes. The transmission allows a selection of three drilling and three hoisting speeds. The Wolverine, while designed primarily for underground drilling, can be used for drilling from surface where either air or electric power is available.
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SHAFT SINKING • GEOLOGICAL INVESTIGATIONS
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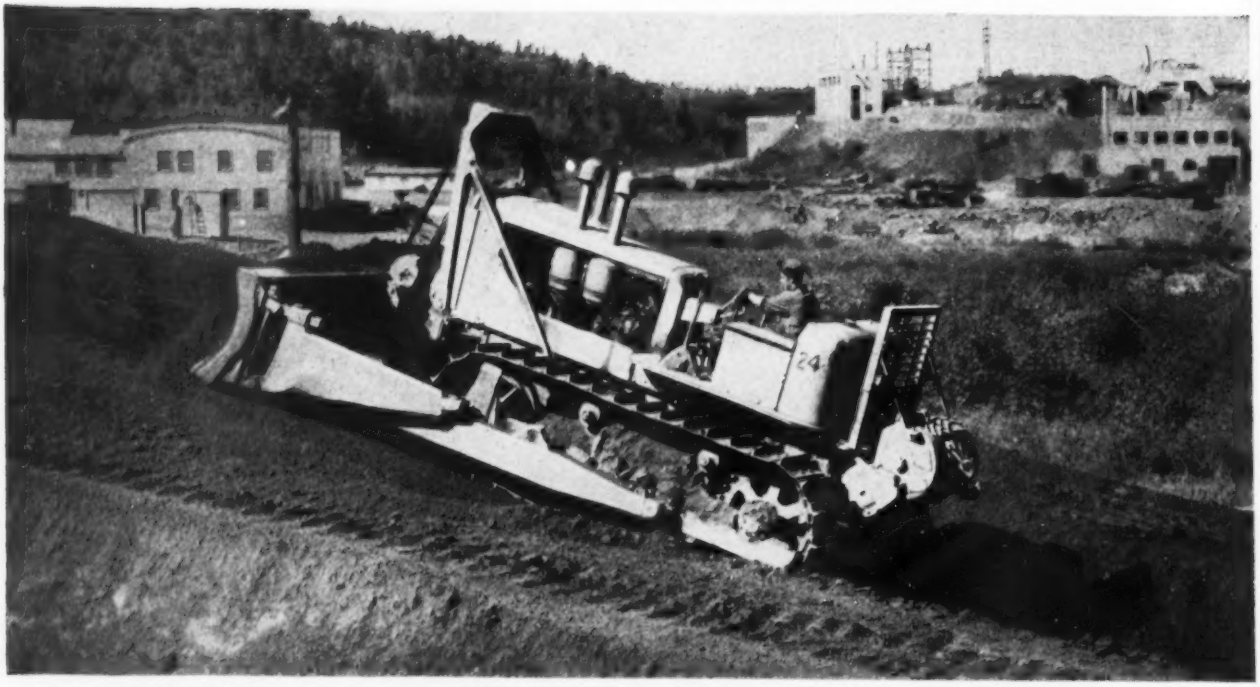
NEW TRENDS IN MINING MECHANIZATION



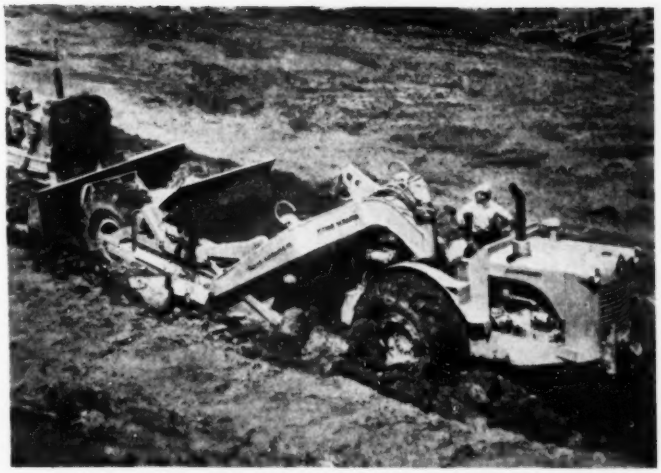
Stockpiles processed ore. HD-20 Tractor also builds access roads . . . maintains tailings dumps . . . cleans up around shovels . . . cuts drainage ditches . . . digs sludge basins and sluice-ways . . . builds reservoirs and pond dams . . . clears and levels building sites . . . tows equipment.

Loads ore underground. HD-5G Tractor Shovel also loads sand and gravel, other bulk materials . . . cleans up around conveyors and hoppers. Special materials buckets, bulldozer blades, other attachments available. Tractor shovels available for all sizes of Allis-Chalmers crawler tractors.

Builds and maintains haul roads. AD-40 Motor Grader levels pit bottoms . . . digs and grades for drainage . . . scarifies . . . prepares dragline sites. Gasoline-powered Model D Grader also available. Handles routine road maintenance — light construction, etc.

TODAY'S demands on mining production require the selection of equipment of the broadest versatility. Allis-Chalmers offers a complete range of material moving and handling equipment — including four sizes of diesel crawler tractors, motor graders, pull scrapers, high-speed Motor Scrapers and Motor Wagons — designed to fit your particular mining applications and to deliver the highest possible output.

Here are some on-the-job views with a few of the many ways in which these modern machines are speeding production and lowering costs.



Strips overburden. 13-yard (9.9m³) heaped capacity TS-200 Motor Scraper also loads, hauls material from open pit . . . clears and levels for camp sites and drill setups . . . levels and grades building sites . . . hauls in supplies. Larger 18-yard (13.7m³) heaped capacity TS-300 available.

Hauls rock overburden. TR-200 Motor Wagon hauls tailings, sand, gravel, silicon, lead and zinc ore. Unit travels fast "off-road" with capacity loads . . . dumps clean every time with 18-ton, (16,330 kilos) hydraulic-controlled rear-dump body. Sides channel-ribbed for rigidity.

Levels tailings dump. HD-20 Tractor with pull-type scraper also loads and hauls ore-bearing material — handles large-scale stripping jobs. Exclusive Allis-Chalmers hydraulic torque converter on HD-20 gives higher output, less upkeep on pulling, pushing and dozing work.

Complete line of pull-type scrapers available, from 2-yard (1.52m³) to 18-yard (13.7m³) sizes.

Your Allis-Chalmers distributor will be glad to analyze your equipment needs and help select the right machines.

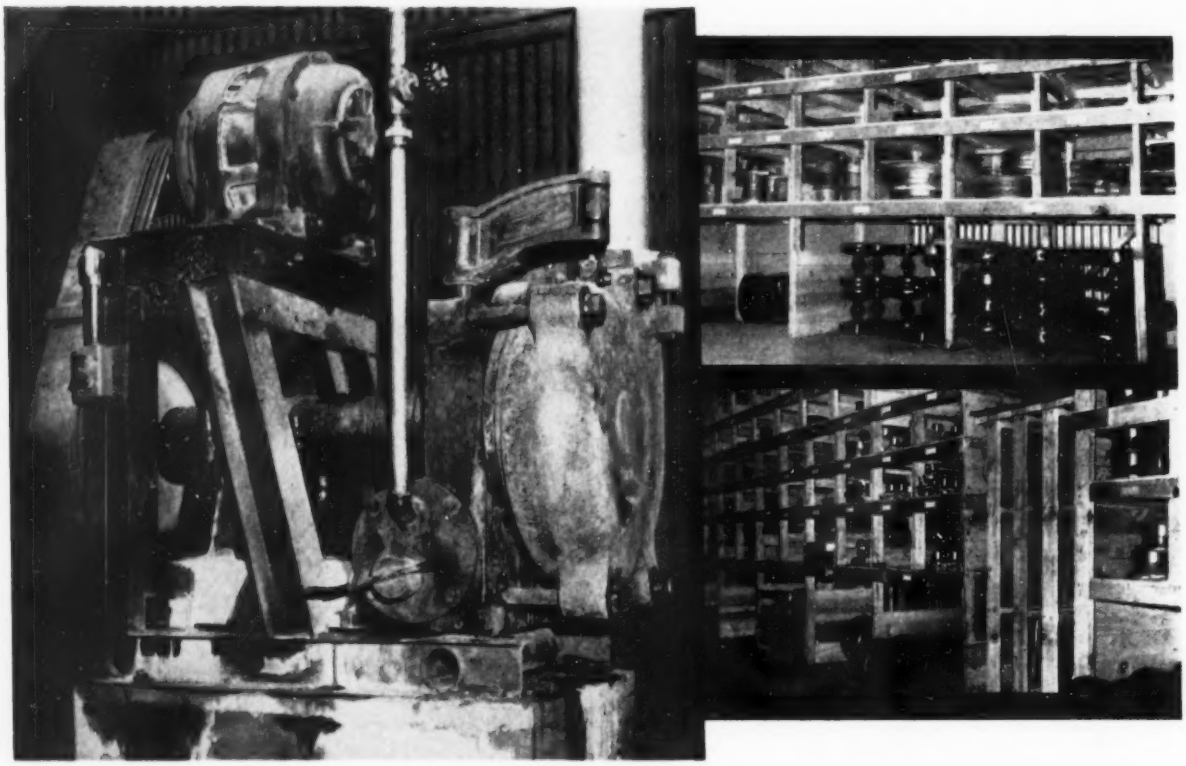
ALLIS-CHALMERS

DEPT. WM 453 — TRACTOR DIVISION — MILWAUKEE 1, U.S.A.

BUILDERS OF MACHINERY SINCE 1847.

WEMCO SAND PUMPS
stay on the job

Because they're tough...
And because these shelves are as near as your telephone



For protection against mill shutdowns and loss of operating time, here is Wemco's **two-way** plan to keep your sand pumps on the job:

FIRST — is the design of Wemco Sand Pumps. In every detail they're built to stand the abrasive wearing action caused by gritty pulps. Special wear-resistant alloys give maximum life to wearing parts which are easily accessible for replacement when necessary. Bearings and shafts are protected from moisture and grit by effective centrifugal seals.

SECOND — is Wemco's stockroom service that keeps **all parts** for **all sizes** available at **all times.** If ever your Wemco Sand Pump requires parts in a hurry, your telegram or phone call gets top priority attention. This prompt emergency service is standard procedure at Wemco, and is provided at no extra cost.

OTHER WEMCO PRODUCTS

Mobil-Mills • HMS Thickeners • HMS Pumps • Cone Separators • Coal Spirals Sand Pumps • Drum Separators • Dewatering Spirals • Fagergren Laboratory Units • HMS Laboratory Units • Agitators • Hydroseparators • S-H Classifiers Thickeners • Conditioners • Fagergren & Steffensen Flotation Machines • Densifiers

Next time you buy sand pumps, buy WEMCO. It's your assurance of reliability . . . backed up with parts and service . . . for steady and continuous pump performance.

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET — SAN FRANCISCO 7, CALIFORNIA

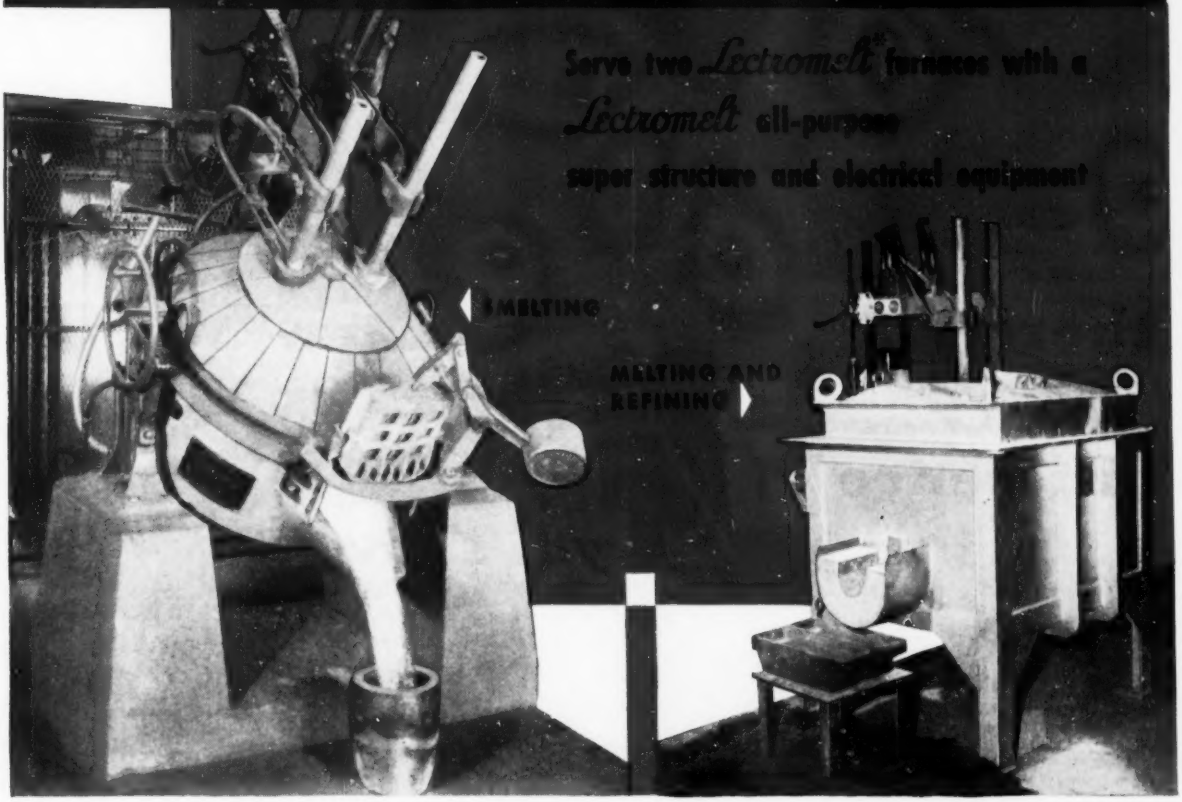
PRINCIPAL OFFICES

San Francisco • Sacramento • Salt Lake City • Spokane • Denver
Pocatello, Idaho • Phoenix • Chicago • Hibbing, Minnesota
New York • Jeffersonville, Indiana • Toronto, Canada

EXPORT DISTRIBUTORS

- Fraser & Chalmers (S.A.) Ltd., P.O. Box 619, Johannesburg, South Africa
- Lilestone & Co., Inc., P.O. Box 3368, Manila, Philippines
- United Development Corporation Pty. Ltd., P.O. Box 3460, Sidney, N.S.W., Australia
- Corporation Commercial Sudamericana S.A., Casilla 505, Lima, Peru

Save money in outfitting your laboratory


Serve two Lectromelt* furnaces with a Lectromelt all-purpose super structure and electrical equipment
SMELTING
MELTING AND REFINING

With these two furnace shells and the one Lectromelt superstructure, your laboratory can handle almost any problem having to do with electric furnace operations. The superstructure can be shifted from one furnace to the other, as required, along with its electrical equipment.

The combination at the left is designed for small scale, batch smelting of ores and concentrates, melting of non-metallics, melting and refining of metallics. The furnace at the right can be used for continuous operations in experimenting on the reduction of ores and melting of non-metallics.

Both furnaces can be employed with direct and indirect arcs. 50 KVA of power is available on low voltages and 100 KVA on high voltages.

Lectromelt engineers have been conducting continuing research for many years on electrothermic reductions, so they can help you put these laboratory furnaces to work proving new processes or improving the old ones. For Catalog No. 104 telling you about this service, write Pittsburgh Lectromelt Furnace Corp., 324 32nd Street, Pittsburgh 30, Pa.

Manufactured In . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co. Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

there's a *BIG* difference ...in this 3/4 yd. shovel!

Look beyond the dipper size when you investigate your next 3/4-yard shovel. Shovels may be rated the same, may even look alike, but that's where it ends when you look at a Lorain TL-25.

Look into the cab to see if power flows directly and efficiently from the engine to the point of use, as it does on the "TL-25".

Look to see if it has a great quantity of duplicate and interchangeable parts . . . does it have "packaged components" to permit quick switching of all major components. The "TL-25" has them.

Look at what these "TL-25" features mean on the job. If you believe *actions speak louder than words,* you'll like the "TL-25" because it really shines on field performance. We'd be glad to show you the proof of these statements.

THE THEW SHOVEL CO., LORAIN, OHIO

3/4 yards of power *plus* . . .

Whether gas or diesel, it goes to work directly . . . tears into the job . . . and turns out profit-earning yardage.

3/4 yards of speed *plus* . . .

You can capitalize on every bit of "TL-25" power because in operation it responds with lightning speed, has high acceleration that kills "drag", and is a muscle-saver for the operator.

3/4 yards of endurance *plus* . . .

Anti-friction bearings, oil-enclosed gears, 5 identical shoe clutches, drop-forged hook rollers . . . and other items of highest quality materials and workmanship assure "TL-25" stick-to-it-iveness on the job.

3/4 yards of selection *plus* . . .

No other machine in *any* class offers such a selection of booms and mountings to hit your job right-on-the-button. Select from 4 crawler sizes, 7 rubber-tire mountings, 7 interchangeable booms.

THE THEW LORAIN®

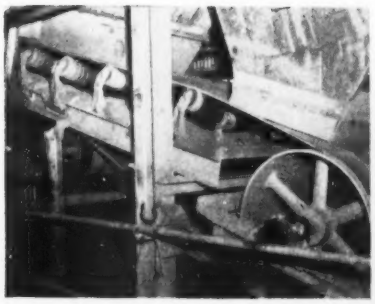
TL 25

SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • HOES

S-A CONVEYING Systems set NEW TONNAGE RECORDS HERE!

An S-A 1200-foot Belt Conveyor and its associated equipment, has increased the loading capacity of this ore dock by as much as 50%. Another case history of S-A Conveying Systems in action.

When an S-A engineer digs into any bulk handling problem, he brings to it a wealth of experience. It has been gained through thousands of S-A Systems engineered to meet just about every kind of bulk handling need. He works with a *complete* line that includes every type of bulk handling equipment. With this "know-how," plus the equipment to back it up, he can *always* recommend the combination that's best for *you*, to do *your* job at lowest cost per ton. A letter will make his services available to you.



S-A Simplex Carriers are used throughout, with pneumatic shock-type carriers at loading and transfer points.

Ore from the stock-pile is picked up by the bridge and dumped into a 60-ton hopper. It is transferred by an S-A Amsco Feeder from the hopper to the 42", 1200-foot conveyor belt. At the far end, an inclined belt discharges into a 100-ton surge bin. Another Amsco Feeder delivers the ore to a weigh hopper, from which it is chuted into rail cars.

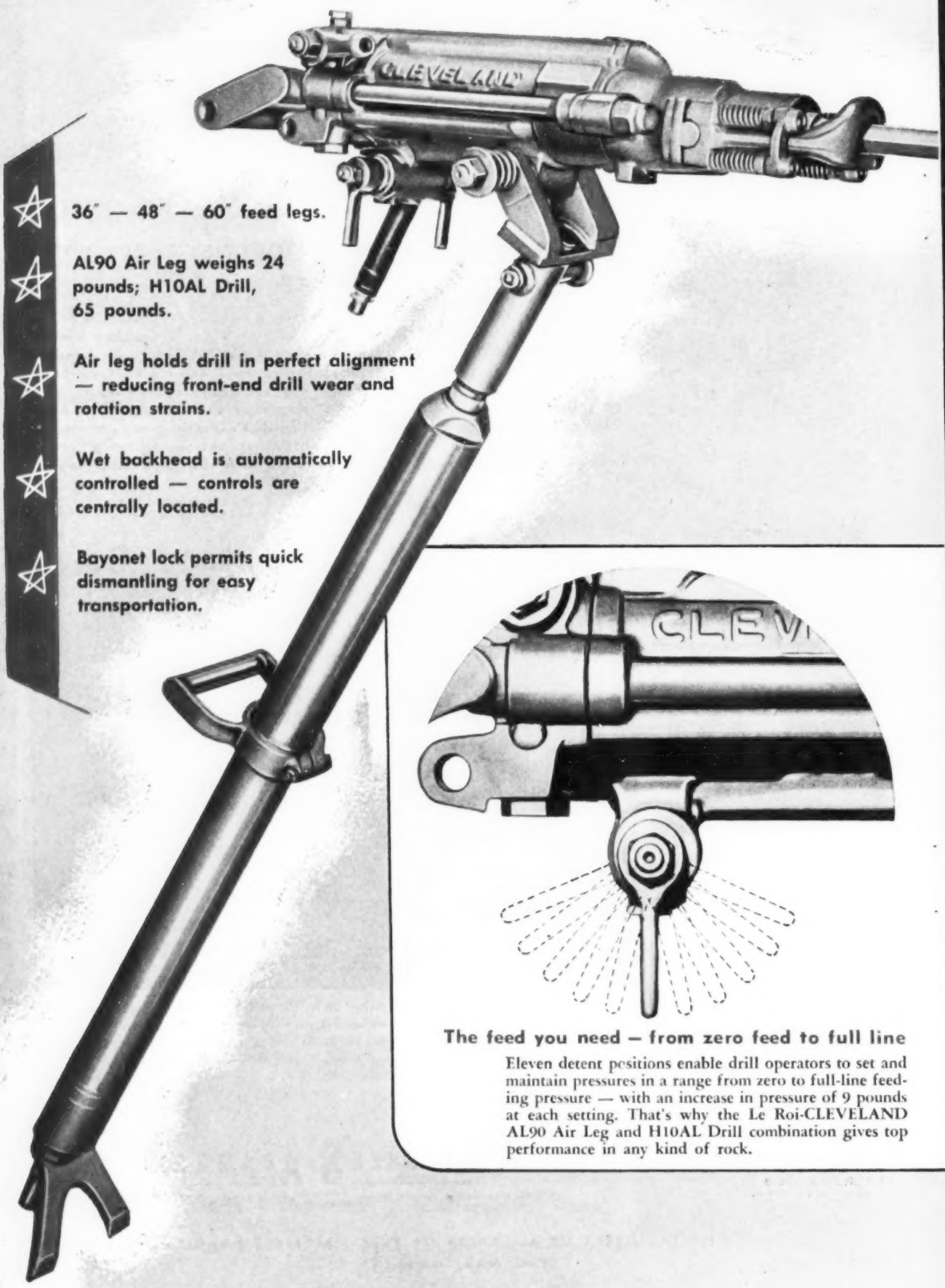
Belt Conveyors
Belt, Pan and Plate Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage and Reclaiming Systems
"Natural Frequency" Vibrating Conveyors
REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Conveyor Belt Cleaners
Headshaft Holdbacks
Grizzlies and Screens
Centrifugal Pilers
Bin Gates and Tunnel Gates
Car Pullers and Spotters
Bucket Elevators
Skip Hoists
SEALMASTER Ball Bearing Units

• **Write for a bulletin on any of the above.**

STEPHEN S-A DAMSON MFG. CO.

13 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT



- 36" — 48" — 60" feed legs.
- AL90 Air Leg weighs 24 pounds; H10AL Drill, 65 pounds.
- Air leg holds drill in perfect alignment — reducing front-end drill wear and rotation strains.
- Wet backhead is automatically controlled — controls are centrally located.
- Bayonet lock permits quick dismantling for easy transportation.

The feed you need — from zero feed to full line

Eleven detent positions enable drill operators to set and maintain pressures in a range from zero to full-line feeding pressure — with an increase in pressure of 9 pounds at each setting. That's why the Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill combination gives top performance in any kind of rock.

You're ahead 3 ways:

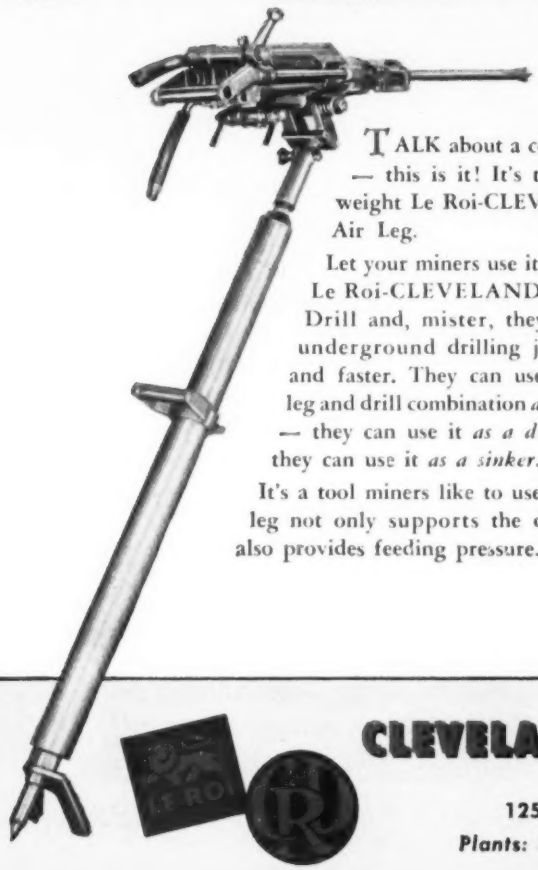
☆1. Easier Drilling

☆2. Greater Footage

☆3. Lower Costs

— with LeRoi-CLEVELAND AL90 Air Leg and H10AL Drill

and exclusive feed control!



TALK about a cost-cutter — this is it! It's the lightweight Le Roi-CLEVELAND Air Leg.

Let your miners use it with the Le Roi-CLEVELAND H10AL Drill and, mister, they do any underground drilling job easier and faster. They can use this air leg and drill combination *as a stoper* — they can use it *as a drifter* — they can use it *as a sinker.*

It's a tool miners like to use. The air leg not only supports the drill, but also provides feeding pressure. And the leg absorbs any recoil. Miners' work is easier; they are less tired at end of the shift.

But that's not all! The feed control is built in — eliminates the necessity for a third hose and cumbersome "Y" connections. There's no feed-control bleed valve — the operator does not have to continually bleed-off air, to maintain suitable feeding pressure. He can change or advance the position of the leg easily and quickly.

Increase your footage — lower your drilling costs — ease the load on your men. Put the versatile Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill to work for you. Write today for complete information.

RD-51

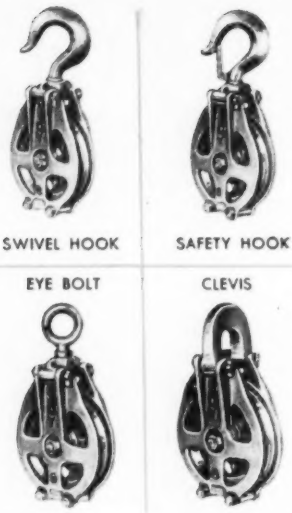
CLEVELAND ROCK DRILL DIVISION

LE ROI COMPANY

12500 Berea Road • Cleveland 11, Ohio

***Plants:* Milwaukee, Cleveland and Greenwich, Ohio**

JOY SHEAVE BLOCKS ARE BUILT TO YOUR SPECIFICATIONS!



HERE'S HOW THEY'LL SIMPLIFY YOUR SCRAPING JOB

Joy Tail Rope Sheave Blocks were developed *in the mines,* by mining men—specifically for the rugged job of scraper loading.

Every design detail has been thrashed out, in service, to give real "bug-free" operation. For example:

- Extra wide sheave wheels reduce rope wear.
- Quick-opening snatch blocks allow fast, easy rope changes.
- Large throat openings and flared side plates will actually pass knots tied in *wire rope.*
- Sealed-for-life bearings are watertight, dust-tight, and require *no lubrication.*
- Tough alloy steel is used for side covers, wheels, hooks, eyelets and clevises.
- All steel construction—can be picked up by magnets if lost in a load.

A Joy Sheave Block is a stout, durable piece of equipment that requires practically *no attention.* It's just the ticket for hard-to-reach-to-service jobs. ● Get the full story today—write for Bulletin 76-D. **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

QUICK-OPENING SNATCH BLOCK CONSTRUCTION

Opened block showing milled slot. Pin removed.

Block closed, pin in place, locking key in "Open" position.

Block closed, pin in place, key in "locked" position.

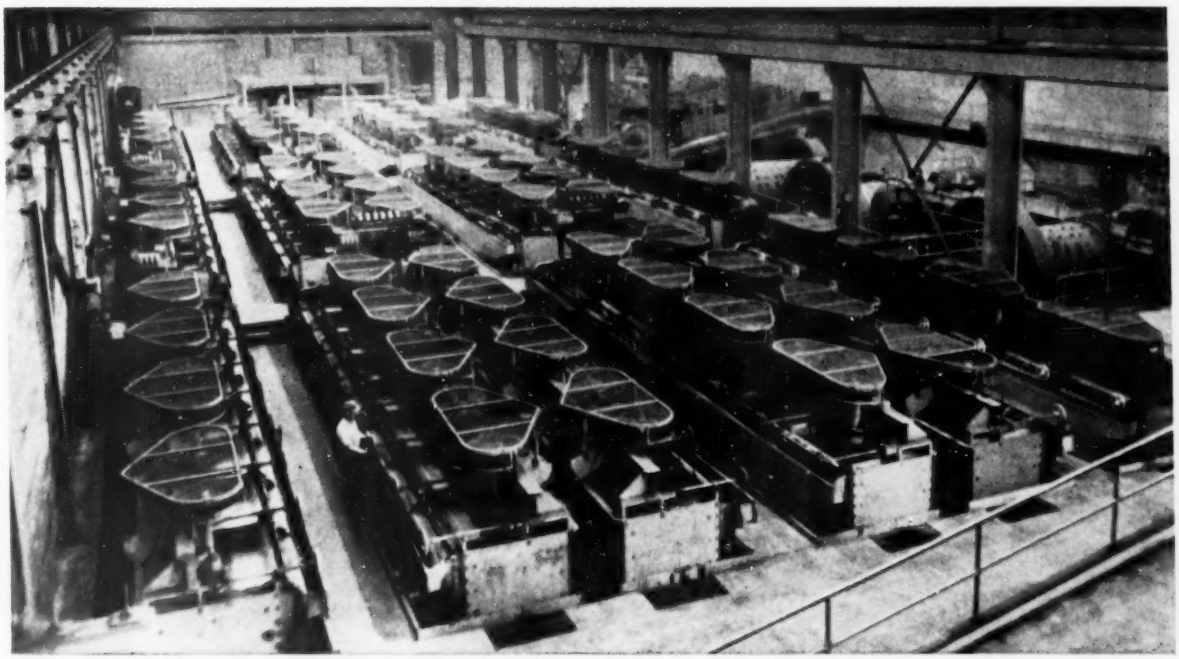
JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

DOW

CUT FLOTATION COSTS WITH DOW XANTHATES

Superior collectors increase profits by providing greater recovery, higher concentrate grade of sulfides



With Xanthates on the job every bubble is loaded to capacity, increasing your recovery and raising your concentrate grade. Because of their greater efficiency in fast, complete separation of the sulfide minerals, Dow Xanthates save you money.

For more efficient differential flotation, Dow offers a wide range of Xanthates of extremely selective collector power. Since all of these collectors are essentially nonfrothing, the operator enjoys complete freedom to regulate frother and collector independently.

Dow also produces Dowfroth* 250, a quality frothing agent giving improved metallurgy with lower frother consumption.

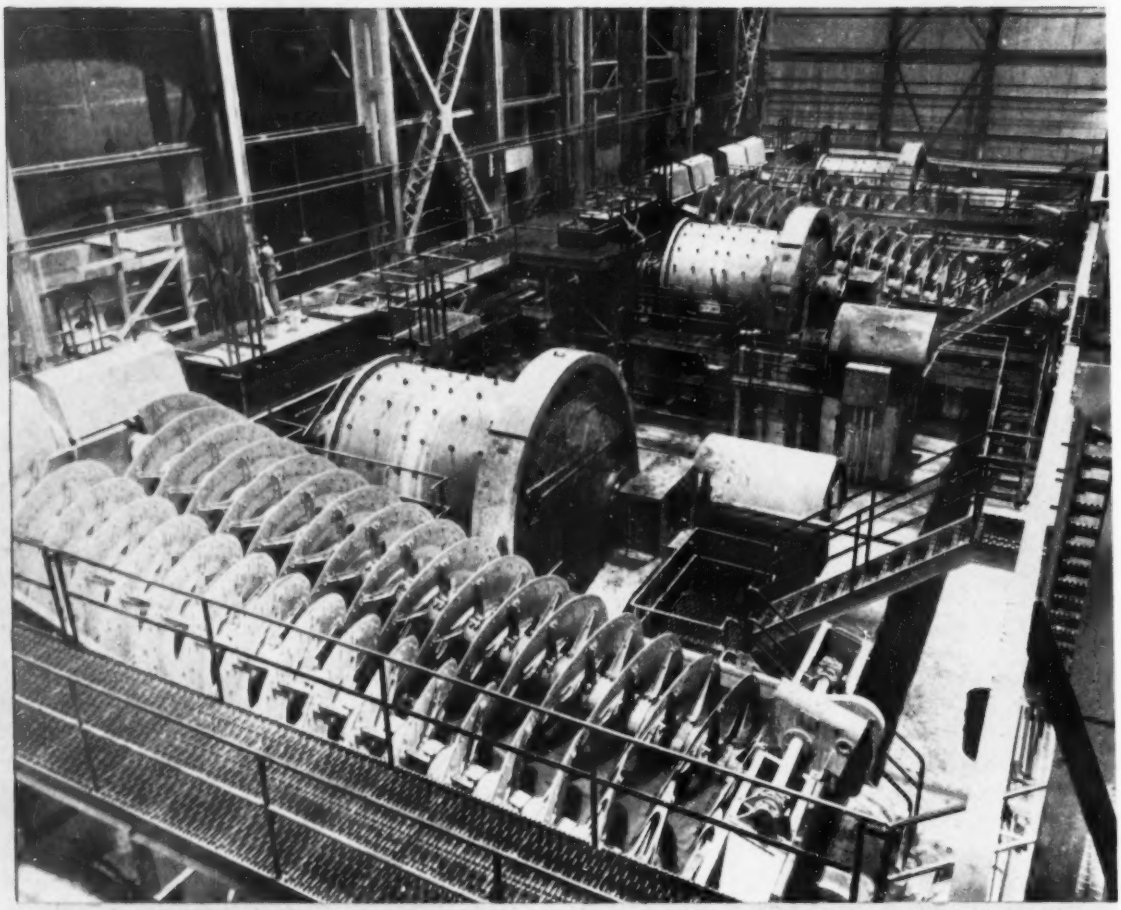
Learn more about these quality flotation agents, Dow Xanthates and Dowfroth 250. For further information and test samples, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, *Dept. OC 3-43.*

*TRADEMARK

you can depend on DOW CHEMICALS

DOW

ANOTHER REPEAT ORDER



3—9'x9' Marcy Grate Discharge Ball Mills and 3—78" Akins Duplex Classifiers recently installed in new mill at Climax. A duplicate grinding section has been ordered for another addition to the new mill.

FOR JOB-PROVED PERFORMANCE INVESTIGATE MARCY MILLS AND AKINS CLASSIFIERS

FROM CLIMAX

FOR COST-CUTTING TEAM OF MARCYS & AKINS

3 more No. 99 Marcys and 3—78" Duplex Akins for new section.

Since 1929 The Climax Molybdenum Co. has placed 11 orders for Marcy Mills and Akins Classifiers—convincing evidence of dependable, cost-cutting mechanical and metallurgical performance. Equipment ordered includes the following:

VIEW OF THE NEW MILL AT CLIMAX

MARCY MILLS

2 — 5′ x 20′ pebble mills

4 — 8′ x 20′ pebble mills

1 — 9′ x 7′ ball mill

12 — 9′ x 9′ ball mills

AKINS CLASSIFIERS

15 — 78" duplex

1 — 78"simplex

1 — 60" duplex

5 — 48" duplex

1 — 45" simplex

1 — 12" simplex

FOREIGN REPRESENTATIVES

MINE & SMELTER

Representatives:

Canadian Vickers, Ltd., Montreal, Canada

W. R. Judson, Santiago, Chile

The Edward J. Nell Co., Manila, P. I.

The Austral Otis Eng. Co., Ltd., So. Melbourne, Austr.

Morgardshammars Mek. Verkstads Aktiebolag, Morgardshammar, Sweden

The Ore & Chemical Corporation, 80 Broad Street, New York City 4, New York
Representatives for Continental Europe

COLORADO IRON WORKS

Licensed Manufacturers:

Canadian Locomotive Co., Ltd., Kingston, Ont., Canada

John Carruthers & Co. (Pty), Ltd., Sydney, Australia

Head, Wrightson & Co., Ltd., Stockton-on-Tees, England

Head, Wrightson & Co., S. A. (Pty.), Ltd., Johannesburg

Sales Agents:

Andrews and George Co., Inc., 5 Shiba Park, Tokyo, Japan

Edw. J. Nell Co., Manila, P. I.

Wright Bros., Credit Foncier Bldg., Vancouver, B. C., Canada

The Mine & Smelter Supply Co.

Denver 17, Colorado

AND ITS SUBSIDIARY COMPANY

COLORADO IRON WORKS CO.

Denver 2, Colorado

OFFICES IN SALT LAKE CITY, EL PASO, 1775 BROADWAY, N. Y. C.

RIDES ON RUNNERS ON BACK-HAUL. THIS ELIMINATES UNNECESSARY WEAR, PROVIDES FOR LONGER SERVICE LIFE.

RIDES ITS LOADS
Saves Horse Power

CAN CHANGE BLADES AND SIDE CUTTERS UNDERGROUND
Easy disassembly permits moving scraper into any working place.

LOW CENTER OF GRAVITY
Practically impossible to turn over. Doesn't fish-tail.

DESIGNED FOR DIG-ABILITY
Digs in and gets a full load on a single pass, regardless of size or type of material or slope of muck pile.

SIZES TO SUIT YOUR REQUIREMENTS

MODEL NUMBER	CAPACITY CU. FT.	TOTAL WEIGHT
2A-26	8	400
2A-30	9	460
2A-34	10	490
AB-36	14	700
AB-42	16	740
2B-36	20	1230
2B-42	24	1340
2B-48	27	1430
2C-60	51	2270

Pacific "Slushmaster" Scrapers are proving their dig-ability and stand-up-ability under almost every conceivable condition in all parts of the world—in the Philippines, Africa, South America, Mexico, the U.S.A. and Canada. The acceptance of these scrapers by mining companies everywhere is due to their design superiority.

They dig in, secure a full load in a single pass and then carry it with less horsepower. Here are typical quotes from satisfied customers: "Best breast cleaning scraper ever designed,"..."It's the 'slushingest' bucket I've ever seen,"..."You have to see 'em work to believe it." Send for Bulletin No. 215 for complete information.

BE SPECIFIC—ORDER PACIFIC. For added efficiency, use Pacific Sheave Blocks, Sheave Anchors, "Round-The-Corner" Sheave Blocks, Jaw Crushers, Bit Knockers and Pacific Wearing Parts.

ALLOY STEEL & METALS CO.

★

ALLOY STEEL & METALS CO., 1848 East 55th Street, Los Angeles 58, California
(Mailing address: Box 15323 Vernon Station, Los Angeles 58, California)

another slugger in the OUTPUT lineup

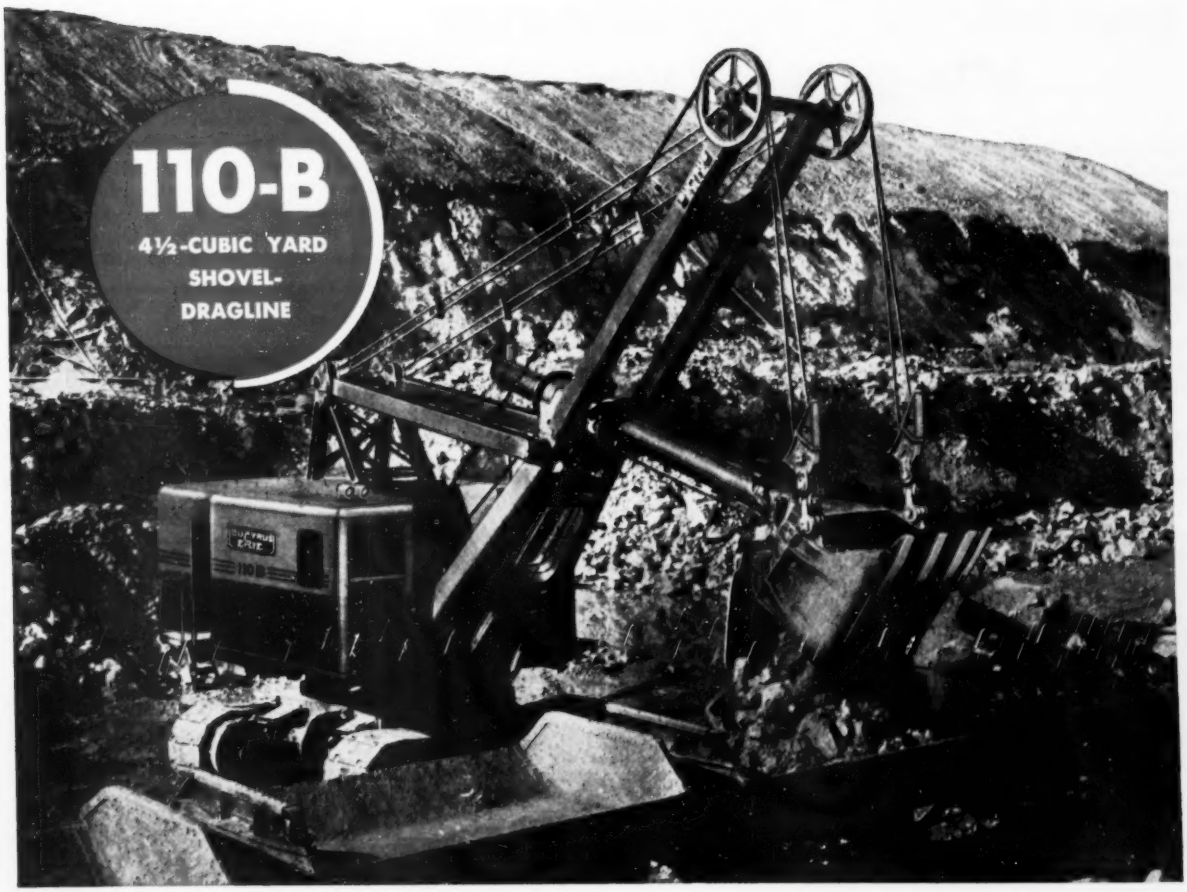
Now — taking its place in the outstanding line of Bucyrus-Erie heavy-duty quarry and mine excavators is the field-proved 4½-yard 110-B — a convertible shovel-dragline which can give you bigger output in loading or stripping at lower cost than any other machine of like capacity on the market today

Like the larger 150-B (6-yard) and 190-B (8-yard) machines, the 110-B features Bucyrus-Erie's exclusive shovel front end. The strong, light two-section boom reduces weight and speeds digging cycle, yet provides ample strength for tough digging. Tubular dipper handle, free to rotate in saddle block, permits digging with one corner of dipper without introducing torsional strains. Powerful effective rope crowd reduces swing inertia because crowd machinery is located on revolving frame. And, twin-dual hoist ropes concentrate power where needed to pull dipper through toughest banks.

Before you buy any machine in the 4½-yard range, investigate the 110-B. It will give you consistently large ouput at lowest cost per yard. For detailed information, write today for Bulletin 110-B-1. 5L53C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN



Loading "Gelex" in 24-foot hole drilled vertically upward from bench in sub-level in Bengal-Tully Mine.

Du Pont "MS" Delay Caps

REDUCE CONCUSSION . . . IMPROVE FRAGMENTATION

in Michigan Iron Mine

In a typical stoping operation at the Bengal-Tully Mine of the M. A. Hanna Company at Stambaugh, Michigan, Du Pont "MS" (millisecond)* Delay Electric Blasting Caps are used both to reduce concussion and to obtain better fragmentation.

On a bench of the sub-level stope illustrated, holes are drilled 24 feet vertically upward and downward. These are loaded with Du Pont "Gelex" No. 2. Tamping is done with a pole made of "Carlon" flexible tubing. The holes are connected in straight parallel, and the blast is fired with a Du Pont Condenser Discharge Blasting Machine providing both greater dependability and safety.

This combination: "MS" Caps, "Gelex," and the Condenser Discharge Blasting Machine produce highly satisfactory results in the Bengal-Tully Mine. Improved fragmentation speeds production . . . reduces hand labor and chute blasting. The short intervals of "MS" Delay Caps do a consistently better job than regular electric blasting caps or long-interval delays. They also eliminate possibility of dynamite in the muck.

Why not put Du Pont "MS" Delay Caps to use in your own mining operation? These caps are contributing to increased operating efficiency in ore mines throughout the country and you may be able to use them to excellent advantage. Any Du Pont Explosives representative will gladly give you complete information about "MS" Delays and other Du Pont blasting supplies and accessories. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

*Available in 14 millisecond intervals of delay: MS-25, -50, -75, -100, -125, -150, -175, -200, -250, -300, -350, -400, -450, -500.

Superior fragmentation results from "MS" Delay Cap blast fired with Du Pont Condenser Discharge Blasting Machine.

DU PONT EXPLOSIVES

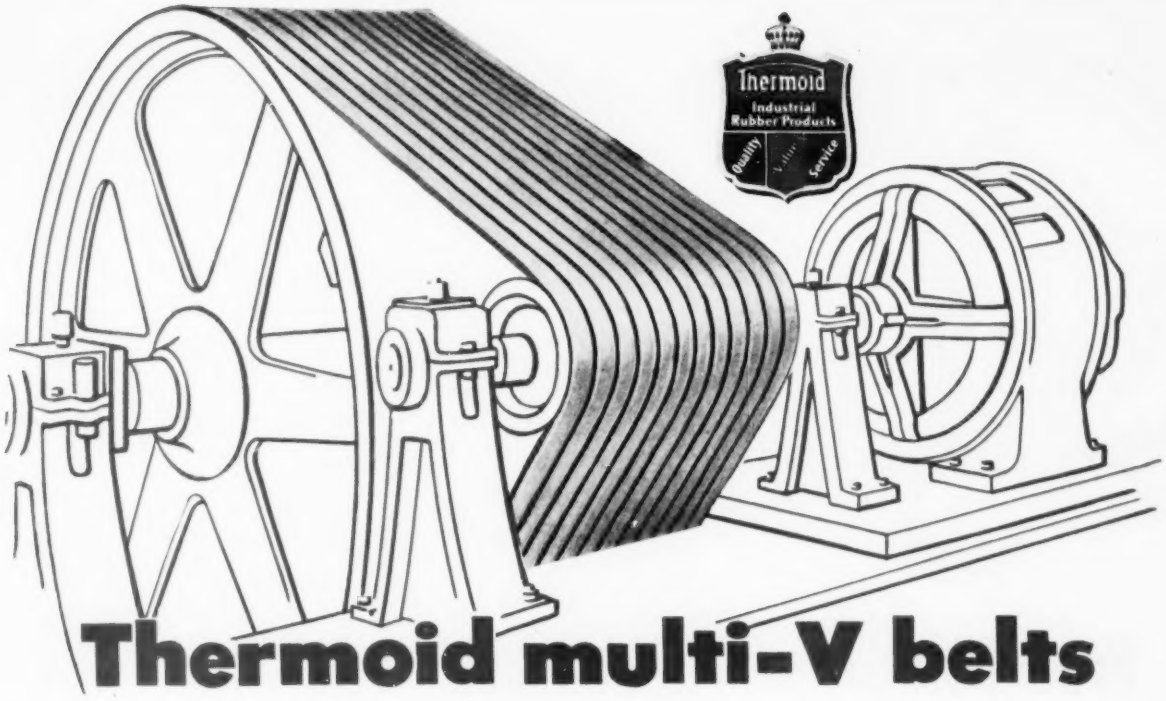
Blasting Supplies and Accessories

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY



Thermoid multi-V belts

pre-stretched for non-slip performance

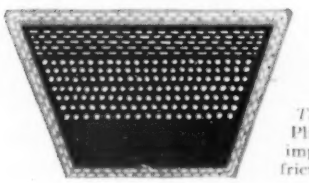
When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

They're built to take it—specially designed to resist internal friction and heat.

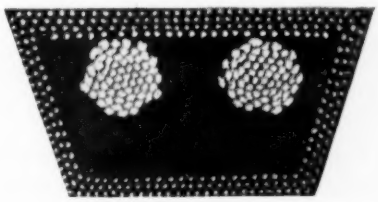
Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

It pays to specify Thermoid.



Thermoid D and E Sections
Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.

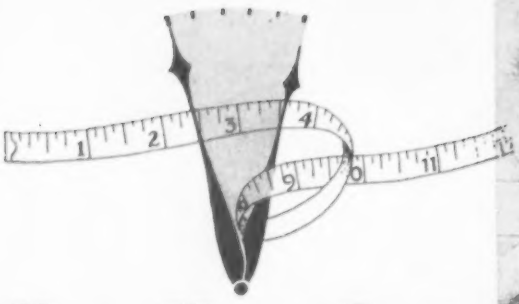
Thermoid A, B and C Sections
Plied cord construction, latex impregnated to reduce internal friction and heat build up.



Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah



How Many Feet Will Five Minutes Buy?

Suppose your mine was shut down for five minutes because of cable failure. How many feet of cable could you buy with the money you lost? Probably a good many feet. That's why we think you should buy nothing but the most reliable for borehole and feeder cables. If your borehole cables carry high voltages underground, then they should be ANHYDREX XX.

These cables are so resistant to water that we guarantee they will not absorb more than 15 milligrams of water per square inch of exposed surface when soaked for seven days at 158° F. That's how sure we are that the cables will prove utterly resistant to water. This same insulation can be operated at copper temperatures up to 176°F. (80°C.) in either wet or dry locations.

The conductors are protected by a specially compounded neoprene jacket that is unexcelled for balanced resistance against abrasion, oil, flame, and ground acids and alkalies.

Simplex-ANHYDREX XX High Voltage Borehole and Shaft Cables do not need metallic sheaths. They are easy to handle, to splice, and to terminate. They come in single or multi-conductor types designed for the voltage range from 2,001 to 17,000 volts.

We will gladly send you more information, without obligation, of course, if you will write to us at the address below.

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

3 vital reasons for using UNOBA

These three pieces of heavy equipment must have dependable, protective lubrication. That's why they're all lubricated with multi-purpose UNOBA grease.

UNOBA gives *outstanding* protection against rust, dust and corrosion. Even steam cleaning and boiling water don't remove UNOBA's tough protective film.

UNOBA eliminates excessive wear because its tenacious coating cushions straining and grinding metal parts, helps absorb shocks.

UNOBA is the *original* multi-purpose *barium*-base grease. When you use UNOBA you reduce grease inventories . . . lessen the chance of using the wrong lubricant . . . save yourself time and money.

Give your equipment dependable protection by changing to multi-purpose UNOBA grease.

UNION OIL 76 COMPANY OF CALIFORNIA

UNOBA is made by the developers of DRILLUBE air drill lubricant. DRILLUBE offers high film strength lubrication . . . *with no sickening drill fog.*

SWITCH TO GM DIESEL

GM Diesel-powered Bucyrus Erie Model 38-B 1½-yard dragline stripping overburden at Indiana coal mine

FOR MORE WORK AT LOWER COST

Today you can have the extra economy, efficiency and dependability of General Motors Diesel power on *any* job from 16 horsepower up.

This faster-working 2-cycle Diesel is available, for example, as original power in 94 sizes and models of excavators (½-yd. to 4½-yd. capacity) built by 21 different manufacturers.

Two-cycle operation means you get more power from a smaller engine — a Diesel that fits where many others won't. It's smoother, quicker-acting, faster-starting power that "hangs on" to a load and gets more work done on fewer gallons of low-cost fuel.

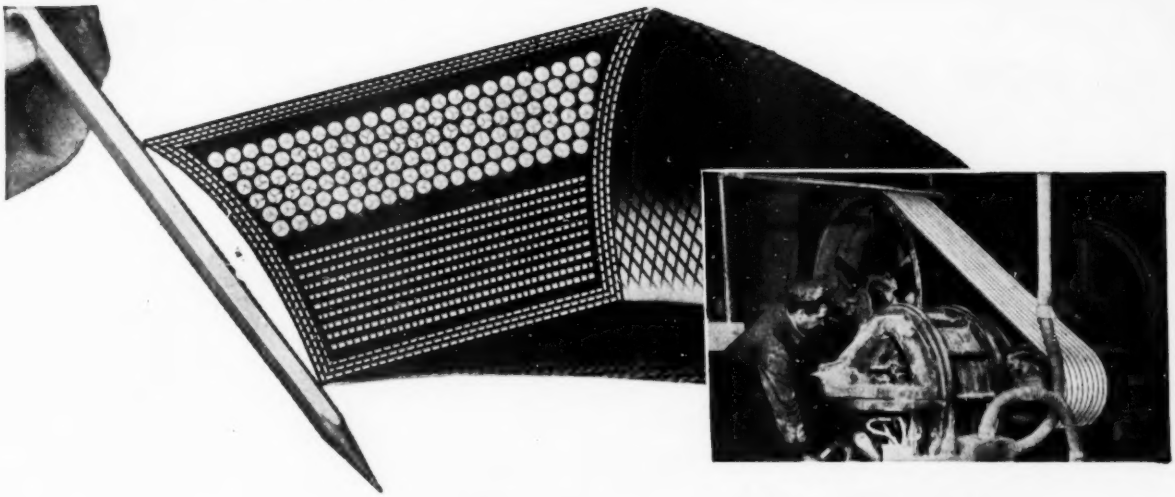
Clean, simple design makes maintenance easy and economical. Most moving parts are identical for all GM Series 71 engines—2 to 24 cylinders. This feature of interchangeability means parts cost you less and you can protect a whole fleet with a small stock of spares. What's more, you need never worry about replacements or service, for GM Diesel engines and parts are sold through a world-wide organization of distributors and dealers. There is one near you.

These are solid reasons why you find GM Diesel engines so widely used in everything from air compressors to giant shovels, and available as original or replacement power in more than 750 different models of equipment. Your nearest GM Diesel distributor will gladly show you in dollars and cents why *it will pay you to standardize on General Motors Diesel power.*

GM
GENERAL MOTORS
DIESEL POWER

DETROIT DIESEL
ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.

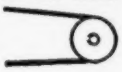


Gates V-Belts are built with CONCAVE SIDES

(U.S. PATENT NO. 1813698)

...that's why they last longer!

If you want lower V-Belt costs, just make this simple test...pick up *any* V-Belt and bend it as if it were going around a pulley.



As the belt bends, grip its sides between your fingers and thumb.

If the belt has *straight sides* you feel the sides bulge out. This forces the sides of the belt to press *unevenly* against the V-pulley . . . and you get concentrated wear at the points shown by the arrows.

Now, try this same test with the V-Belt that is built with CONCAVE SIDES **—the Gates Vulco Rope.**

As this belt bends, you can feel the CONCAVE SIDES *fill out* and become perfectly straight.

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope and the CONCAVE SIDES therefore mean longer belt life and lower V-Belt costs for you.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

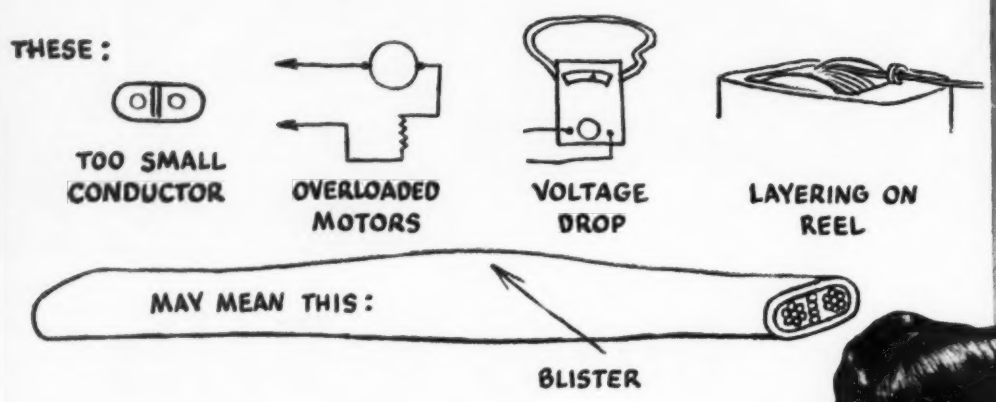
CS-535

V-Belts — Hose Molded Rubber Goods for industry World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

HOW TO SPOT DAMAGE FROM CURRENT OVERLOAD . . .



. . . AND WHY THERE'S GREATER HEAT STAMINA IN ANACONDA'S NEW MINING MACHINE CABLE

Blisters, formed by gases from overheated installation, are a sure sign of cable overloading. A torn cable may result. Since you can't always control overloads, it's important to choose *quality* cable.

Today, due to better design, jackets and insulation, good cables shouldn't cook on the reel the way they used to. But this only makes overloads harder to detect. They still may be present . . . caused by too small a conductor, overloaded machines, voltage drop or even layering of the cable. With 4 layers on the reel, according to I.P.C.E.A., unventilated bottom layers lose 65% of capacity.

WHY THE NEW ANACONDA CABLES ARE SAFER

First, they are more flame-resistant. Jacket is made from a new neoprene formula. Improved cold-rubber insulation gives greater heat stamina. Patented breaker strip* insures a safer ground. No ANACONDA Cable has ever failed a U. S. Bureau of Mines flame-test!

CABLE LIFE NOW MUCH LONGER

In 15 mines recently surveyed, ANACONDA Cables on shuttle cars are lasting up to 300% longer than cables made only a few years ago. Together, jacket and insulation protect these cables better – especially in wet mines where sliver-cuts can cause shocks. The cables are tougher. New-type stranding flexes better under tension.

All this means economy because *one* break in cheap cable costs more than you can save by buying on price. For a sample of this new cable, call your Anaconda Sales Office or Distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 58302

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

*U. S. Patent No. 2,455,773

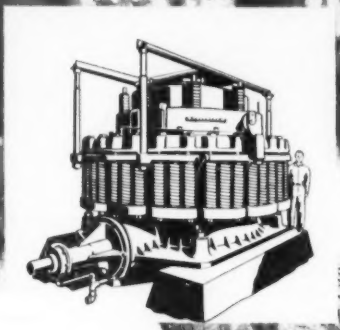
Photo from DeBeers Consolidated Mines, Ltd.

from this BLUE GROUND . . .

come the CROWN JEWELS of Industry

DIAMONDS have been the supreme jewels for centuries—yet the real value of the diamond today is found in its industrial applications, where fully 75% of the diamonds mined are used. In South Africa, the largest diamond producing region in the world, these *crown jewels of industry* are found deep in the earth, in volcanic rock known as *blue ground . . . and for every ton of blue ground mined, less than 1/8th carat is recovered.*

Of prime importance to the major diamond mines of South Africa is a dependable method of crushing the blue ground to the required fineness without destroying the diamond crystals, yet maintaining a minimum cost per ton produced. This important combination is found in the *SYMONS* Cone Crusher . . . and extensive installations of these crushers, as well as *SYMONS* Vibrating Screens, in the world's diamond mines testify to their ability to maintain, year after year, *continuous high capacity production with uninterrupted, trouble-free service.*



• SYMONS Cone Crushers . . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter —in capacities from 6 to [illegible] per hour.

C552

NORDBERG MFG. CO., Milwaukee, Wisconsin

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON • TORONTO

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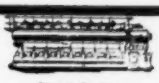
SYMONS Primary Crushers

Grinding Mills

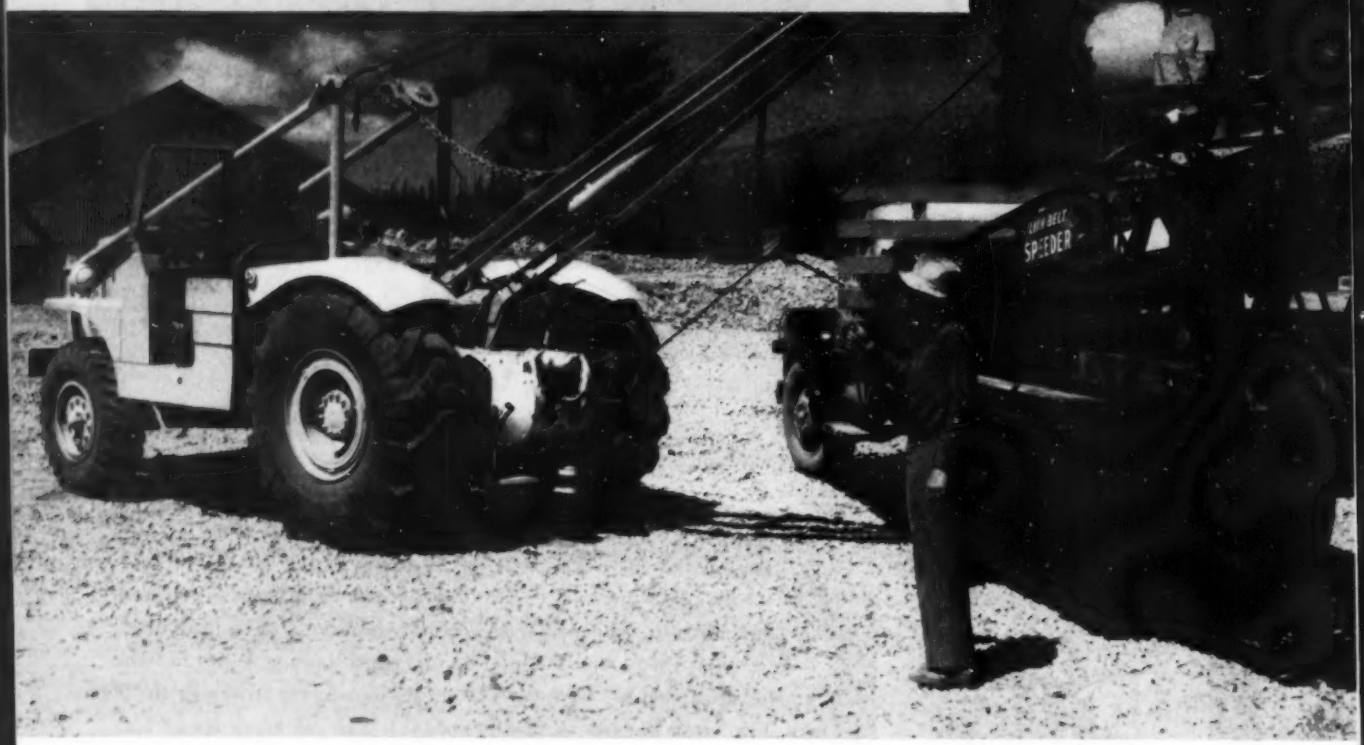
Mine Hoists

SYMONS Vibrating Bar Grizzlies and Screens



Diesel Engines

You'll never run out of uses for the DW10



The versatile Caterpillar DW10 Tractor is one of the most useful pieces of equipment a mine can own.

In the world's largest molybdenum mine at Climax, Colo., C. Ryan & Son have equipped this all-purpose Cat* wheeled Tractor with a boom to unload shovel equipment at the open pit. Like the other Caterpillar-built Tractors he owns, Lee Ryan considers the DW10 "economical and tough."

And the sturdy, fast-moving DW10 has a multitude of other uses around a mine. It will move ore or overburden in rough going when teamed with a No. 10 Scraper. It also can be hitched for fast hauling to a W10 Wagon.

The DW10 is ideal for hoisting and towing when equipped with a winch. It pulls easily as much as 80 tons when equipped with a trailer. Some owners hitch it to a sprinkler wagon, others use it for bulldozing and tamping. It moves railroad cars in a steel mill, and is easily teamed with an elevating grader. Its uses are endless.

Many uses are possible because the DW10 is a soundly engineered tractor with a matched Caterpillar Engine. It has tenacious lugging ability and operates on inexpensive No. 2 furnace oil.

Ask your dealer to demonstrate this all-purpose tractor. You'll never run out of uses for it.

CATERPILLAR, San Leandro, Calif.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

—Drifts and Crosscuts—

Mining Fits Every Criterion—The sliding scale equalization tax on lead and zinc first outlined on this page in the November 1952 issue continues in the news all over the mining world. Legislation to provide such a tax has been introduced in the United States Congress by Representative Simpson of Pennsylvania as part of his bill (H. R. 4294) "To extend the authority of the President to enter into trade agreements under section 350 of the Tariff Act of 1930, as amended, and for other purposes."

Abroad, the Simpson Bill is apparently not too well understood. Canadian catch phrase makers have called it a "shut-out" proposal. Make no mistake—the United States' mining industry and metal users want and need—normal imports of lead and zinc. Not the annual dumping of 615,481 tons of lead and 565,029 tons of zinc as happened in 1952 in contrast to the average of 336,290 tons of lead and 414,612 tons of zinc for the preceding 10 years which, of course, included World War II when every pound of metal from all sources was needed.

The Canadian and other producers would be much better off to export say 1,000 tons of lead and/or zinc at 16 cents per pound than to have to produce a 33 1/3 percent greater tonnage—1,333—at the recent prices of 12 cents per pound for the same sales income.

At this time of so much talk and discussion on tariffs and trade, it is a stimulating experience to read that the United States Council of the International Chamber of Commerce, while endorsing "Free Trade" and tariff reductions, does make certain exceptions—exceptions for "the preservation of strategic industries and skills," and for "protection against foreign dumping."

No one can deny the strategicness of the domestic mining industry as an element of national strength—and possibly for national survival. A miner is as skilled as a precision machinist. "Protection against foreign dumping" of lead and zinc at low prices, unrelated to their true cost of production is exactly what the Simpson Bill is designed to do.

Another viewpoint on tariffs and domestic defense industries has been outlined by Gwilyn A. Price, president of the Westinghouse Electrical Corporation. In a speech in Washington, D. C., on May 1, he warned that eliminating tariffs protecting defense industries would damage economy and endanger security. He said, "the present liberal, low tariff policy has dropped the average rates on imports from 25 percent in 1934 to 13.3 percent in 1951, and today more than half of our imports are admitted duty free. . . . The economic health and stability of this nation are the first line of defense of all free nations. . . . We will do the nations of the free world no good if through excessive imports we forced skilled people out of work and defense industries out of business."

In this magazine's news section are reports of mine curtailments and closures. Defense industries out of business.

The mining industry believes that provisions of the Simpson Bill will assure the existence of a domestic mining industry. Its passage and enactment into law is not assured. There is no question of the need for passage of some kind of legislation. Import quotas might be in order if Simpson Bill's lead-zinc provisions are deleted, which is a distinct possibility.

London Metal Prices—In recent months, the London market has been setting the world price for metals. . . . Accordingly, arrangements have been made to carry London prices as well as United States prices in each issue. . . . Watch what the London prices are as a tip to what can happen here.

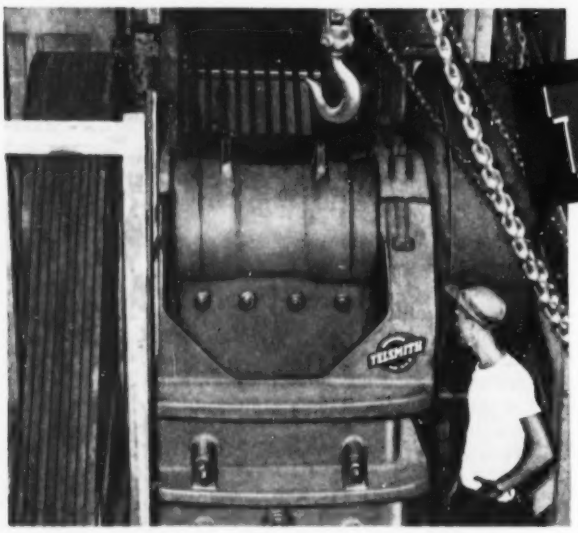
Domestic Developments—Don't look for an early ruling on the World War II gold mine damage cases by Commissioner Day of the United States Court of Claims . . . The 16 gold mining companies must file their proposed findings of fact with Commissioner Day before June 1. . . . The government's lawyers will be expected to file their proposed findings of fact on or before July 1. . . . Companies will then have 30 days to reply to government's proposed findings after their filing. . . . ¶ For those who haven't filed damage claims, the time is short. . . . Your claim must be filed before July 14th. . . . Do it today. . . . ¶ Contrary to reports published in other mining journals, officials of the Bethlehem Steel Corporation say there is no truth to report that Bethlehim will develop an open-pit iron mine near Grass Valley, California and ship to east coast from port of Stockton. . . . ¶

Metal Markets—A new tin use with an important future is that of organotin compounds in the production of plastics. . . . They are being developed at the Tin Research Institute at Greenford, England. . . . ¶ Exports of iron ore to Japan are declining. . . . Record shipments were made from Nevada mines in 1952. . . . Japanese are getting more ore in Philippines, Malaya and Portugese India. . . . Shorter ocean haul and some purchases can be made with Sterling currencies. . . . ¶ Is Kennecott Copper Corporation going into the aluminum business? . . . Interest in British Guiana bauxite could mean a start from ore to metal. . . . Anaconda Copper Mining Company started the other way in refining purchased alumina. . . . ¶ Paper made from silver copper aluminum or zirconium is now possible. . . . Big uses will be where high temperature resistance and electrical and heat conductivity are important. . . . Most can withstand a continuous temperature of 500° C., but are mechanically weak. . . . They may be in for a big future because they are radiant resistant.

Treatment Trends—An electrolytic deposition process for titanium metal production has been developed on a laboratory scale. . . . A small pilot plant is now testing at a semi-production stage. . . . If proved practical, it could lead to commercial production.

Yearbook Correction—Through an unfortunate printing error, the pictures of Charles Will Wright and John Beaupre Dorsh, co-authors of "An Accounting of World Mining for 1952," were transposed on page 63 of the Yearbook. MINING WORLD sincerely regrets this mistake and any embarrassment it may have caused the authors. This error is doubly unfortunate for Mr. Dorsh is widely known to many readers as a former editor of MINING WORLD. He knows the importance of proper authorship credit.

Headframe and concentrator of Bluebell Mine at Riondel, British Columbia



Since placed in operation at the Bluebell Mine in April, 1952, this 25" x 36" Telsmith has crushed about 95,000 tons in less than six months. Telsmith Jaw Crushers are made in 9 sizes: 10" x 16" to 30" x 42"; capacities: 22 to 300 tons per hour.

Send for Bulletin 280.

TELSMITH

Jaw Crusher

in one of Canada's oldest mining operations

Over 100 years ago Indians and trappers got lead for bullets from the ore deposits on the shores of Kootenay Lake, near Trail, British Columbia. And here, today, the new mill of The Consolidated Mining and Smelting Company of Canada Limited, is handling large quantities of lead-zinc-silver ore to produce lead and zinc concentrate. All primary crushing is satisfactorily handled by a Telsmith 25" x 36" Jaw Crusher at the rate of about 100 tons per hour.

Ain. 35

SMITH ENGINEERING WORKS, 4034 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Mine & Smelter Supply Co. Denver 17, Colo.
Fouiger Eqpt. Co. Salt Lake City, Utah
Mines Eng. & Equip. Co. San Francisco 4, Calif.
Garlinghouse Bros. Los Angeles 21, Calif.
Lee Redman Equip. Co. Phoenix, Arizona
The Sawtooth Company Boise, Idaho
General Machinery Co. Spokane 1, Wash.
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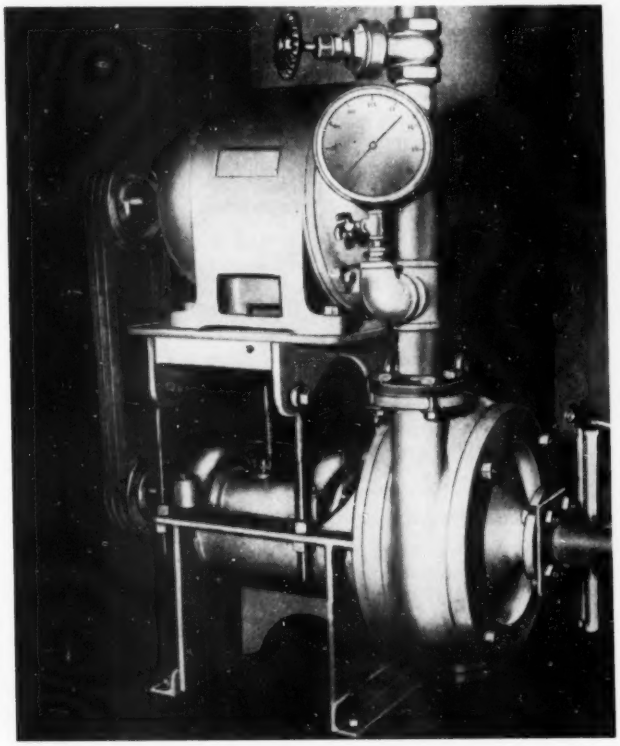
3rd year of successful service

VACSEAL VERTICAL PUMPS

L & STANDARD



This success story concerns a Vacseal Pump — the first manufactured and put in service in the United States. It was installed for the handling of abrasive pulps back in 1950. Its three years of operation has been satisfactory in every way. Only one part has been replaced and the pump has required minimum servicing. In fact, this and many other Vacseal Pumps — vertical and standard — have been used in exhaustive and gruelling tests over the 3-year period, handling both abrasive and corrosive materials. The detailed records spell out . . .

EXCELLENT SERVICE

WRITE FOR CATALOG

Gives full details on unique VACSEAL "glandless" feature that eliminates impeller adjustments and requires no sealing water to protect glands and clearance spaces.

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CAPITOL CONCENTRATES

TUNGSTEN PURCHASE PROGRAM EXTENSION APPEARS POSSIBLE

The latest impression in Washington is that the Aspinall-Malone (H. R. 2824) bill to extend the tungsten purchase program to July 1, 1958, has a good chance of passing. Hearings are scheduled both in the House and the Senate during May. The bill does not ask for additional funds or an increase in the total amount to be purchased, so should not be resisted by the economy bloc.

It is understood that DMPA, at first adverse to the extension, has decided that if GSA will publish figures frequently on the amounts purchased it will favor the bill. Publishing the figures will notify the mining industry how nearly the 3,000,000 unit quota is to being saturated and thus automatically warn operators not to start projects when the program is nearly at an end.

Shipments to the purchase depots for the first three months of this year totaled about one half of all previous shipments made up to the first of the year. This increased rate of acceptance by GSA is due partly to more properties coming into production and partly to the low price of foreign tungsten.

• *Woozley Heads Bureau of Land Management*

Secretary of the Interior McKay has appointed Edward Woozley of Idaho, to the directorship of the Bureau of Land Management. Woozley was formerly state land commissioner of Idaho.

A hitch developed when Marion Clawson, the incumbent director of the Bureau of Land Management, refused to resign. While the directorship of the U. S. Bureau of Mines is appointive, that of the Bureau of Land Management is a civil service position, theoretically inviolate from political changes. Clawson demanded that, according to the Civil Service Commission rules, he be furnished with specific charges in writing stating the reasons for his dismissal and then be given a reasonable time in which to answer them. Clawson also refused to accept the substitute position offered him; whereupon Secretary McKay ordered his dismissal on charges of insubordination.

The episode shows that means can be found by the Administration to dispossess the bureau incumbents who have been making it too tough to get public lands into private ownership and development and onto the state tax rolls.

• *Magnesium Plants To Be Closed*

The extent to which the Administration is restricting the defense effort is indicated by the report that five of the six plants now producing magnesium under government contracts will be closed. It cost plenty to get them into production. Manufacturing contracts made by the Department of Defense still are in force. A good deal of the money appropriated for the defense program for making materiel of war still has not been committed, and some of the defense projects have years to run. The presumption is that the over-all consumption of metals should be not much less than that originally planned for, although the slow-down or stretch-out of the programs took the heat off immediate shortages. Why then did the original planners contract for 5/6 more plants than are needed? Or are the present shutdowns a mistake? *Something* clearly is or has been out of gear.

• *New Contracts For Foreign Minerals*

The government still is underwriting foreign mineral production. While domestic mines no longer seem to be able to get new floor-price contracts or other aid, an agreement has been reached whereby Bolivia will receive $63.00 per unit for its tungsten and the Molybdenite Corporation of Canada, Ltd., has been guaranteed 63 cents a pound for 6,000,000 pounds of molybdenum.

• *New Projects Will Be Restricted*

DMEA, according to reports, has obtained an allotment of $1,500,000 of additional defense funds for exploration work with an understanding that it will be applied to minerals high on the critical list such as beryl.

• *Monetary Loss Is High*

Estimates show that, on a basis of an annual output of 500,000 tons annually, the drop in the price of lead during the past year has cost producers around $60,000,000.

• *Committee Rejects Stockpile Appropriation*

For the first time in many years the House Appropriations Committee has refused to include any new money for the nation's strategic stockpiles. Influenced in part by the economy drive, and perhaps feeling that the emergency no longer is so critical, the committee chiseled from the appropriation the $225,000,000 item which President Eisenhower had requested.

• *"Round and Round We Go"*

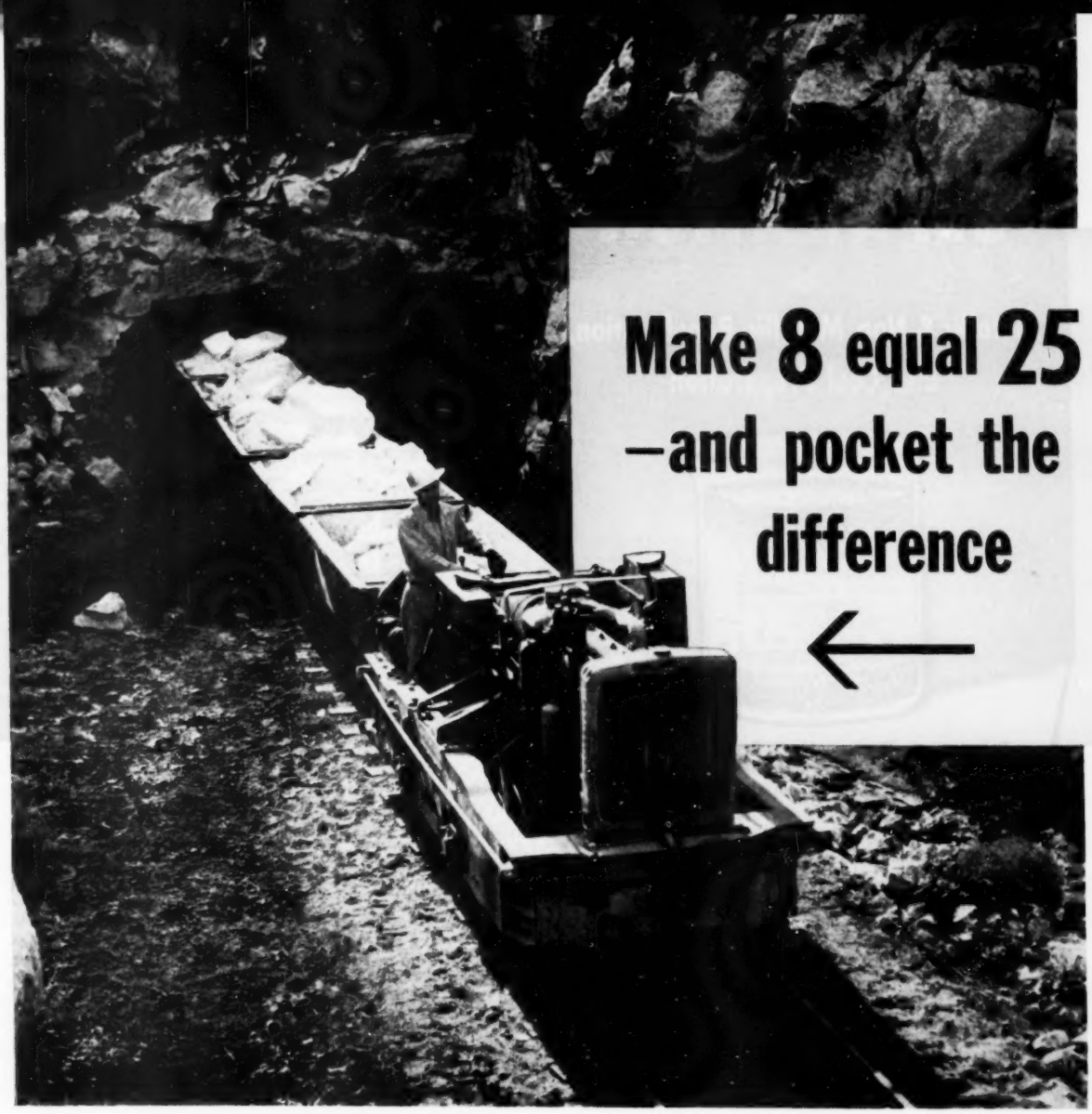
ODM Director Flemming has announced that the Emergency Procurement Service will cease purchasing copper for the national stockpile to relieve a tight market, yet the financial papers predict a drop in the copper price due to a "flood of foreign copper" and a "heavy inflow of scrap." Are we to be treated to a repetition of the performance of lead and zinc?

• *Chrome Limitation Is Removed*

The General Services Administration has removed the limitation upon the amounts of chrome that can be shipped to its Grants Pass, Oregon, depot by any one producer. Also, the program's expiration date has been extended to June 1955, during which time the depot is authorized to take a total of 200,000 tons. Under the new order, the depot will cease buying January 30, 1955, or when the total has been received, whichever first occurs.

• *Young Resigns From DMPA*

Howard I. Young, who has served as deputy administrator of the Defense Materials Procurement Agency, has resigned. It is understood that no one will be appointed in his place, although so far no order has been



Make 8 equal 25 —and pocket the difference

To haul more than 800 tons of gypsum rock daily, once took 25 gallons of gasoline a day. Today it takes only 8 gallons of inexpensive Diesel oil!

National Gypsum Co., owner of the mine near Sun City, Kan., made only one change. It bought a Caterpillar D315 Diesel to replace the gasoline engine on its Plymouth locomotive. Fuel costs today are reckoned in *fractions of pennies*—less than ⅛ of a cent per ton!

But there are other reasons for the switch to the Cat* Engine. Samuel Shepler, mine superintendent, explains some:

"According to our findings, Caterpillar Engines are the only ones we can use successfully in the mine because of their lack of fumes. That and the fact that they are sturdy and dependable made our choice."

Engines and electric sets, in 12 sizes up to 500 HP and 315 KW, have their long, productive life engineered into them. Translated into dollars that means you save on down time costs.

Add this saving to your low, low fuel costs and the profit margin begins to climb. Standardizing on Cat equipment makes sound business sense.

Your Caterpillar Dealer—who specializes in quick, efficient service—will be glad to show you on-the-job proof of how these dependable power plants can earn for you. You set the date!

CATERPILLAR, San Leandro, Calif.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

HEAVY-MEDIA SEPARATION

for

Metallic & Non Metallic Beneficiation, and Coal Preparation

Today nearly 80 Heavy-Media Separation plants are concentrating some 16 minerals in 17 States, Alaska and 12 foreign countries. Plants range in capacity from prefabricated units treating 50 tons per hour to custom-built installations with a daily capacity of 25,000 tons. Now being successfully beneficiated are such diverse materials as: Coal, Iron Ore, Zinc Ore, Lead Ore, Spodumene, Diamond Ground, Gravel, Barite, Chromite, Andalusite, Magnesite, Lead-Zinc Ore, Tin Ore, Fluorspar and Garnet.

Through this widespread use, Cyanamid has accumulated considerable data and experience on the applicability of Heavy-Media Separation as a preconcentration process in conjunction with flotation and other recovery methods, as well as to make a finished concentrate on ores previously considered too low-grade for profitable treatment.

Cyanamid Field Engineers stand ready to work with you in modernizing your flow schemes. On request, we will be pleased to have the Cyanamid Field Engineer nearest to your mill call upon you.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK

issued transferring the agency or absorbing it into another agency. Although DMPA has done little this year, it has considerable unfinished business which must be taken care of by someone. Young will be missed.

• *Union Supports Sliding-Scale Tariff*

The United Steelworkers of America is reportedly solidly behind the Simpson bill, H. R. 4294, which would extend the Trade Treaties Act and would place a sliding-scale tariff on lead and zinc imports. The Simpson bill also would add to the present Trade Treaties Act important protection clauses to prevent the shutdown of American industries due to a flood of foreign-made products.

• *House Takes Favorable Action*

H. R. 3915, the bill to permit the mining, development and utilization of the mineral resources of all public lands withdrawn or reserved for power development, has been passed by the House of Representatives and sent to the Senate for further action.

• *Fringe Benefits May Be Tax Target*

The Internal Revenue Bureau is casting a covetous eye on the "fringe benefits" provided many employes and which so far have not been regarded as compensation subject to income taxes. These benefits in the mining industry include the employer's share of pension plans, sickness and accident insurance premiums, discounts on goods purchased, medical care, recreational facilities, etc.

There are indications that the old test of taxability of fringe benefits may go by the board. The rule has been that such benefits escape taxation where they are furnished for the convenience of the employer. Now it is proposed to substitute an "economic benefit" rule. Easy-to-measure benefits probably will be the first on the bureau's list for taxation. These include such things as free lunches, clothes, tools and housing. Indications are that the bureau will attempt to treat these as taxable income to the employe at the "market value" rather than at the cost to the employer. Application of the economic benefit principle to such items as recreational facilities and medical services will be more difficult to apply.

A survey of the copper mining industry in Arizona revealed that the large copper mines are paying an average of $715.28 per employe annually in fringe benefits over and above regular and overtime wages. These payments amount to 15.67 per cent of the payroll. Fringe benefits which are paid in cash are regarded as income and subject to income-tax payments. Cash fringe payments by the Arizona copper mines amount to an average of $326.34 per employee, leaving $388.94 per employee which so far has escaped the grasp of the income tax collector.

COMING CONVENTIONS

July 13 to 16, 1953. Fiftieth anniversary meeting IDAHO MINING ASSOCIATION, Sun Valley, Idaho.

August 31, September 1 and 2, 1953. MINERALS BENEFICIATION SUBSECTION, IAME, Mesabi Range meeting, Hibbing, Minnesota.

August 31, September 1. Third Biennial Briquetting Conference, Banff Springs Hotel, Banff, Alberta, Canada.

October 28 through 31. INTERNATIONAL MINING DAYS sponsored by the New Mexico Mining Association and the Mining Committee of the El Paso, Texas Chamber of Commerce. El Paso, Texas.

INTERNATIONAL PANORAMA

SPRUCE PINE, NORTH CAROLINA—United States government purchases of mica at the buying depot here are at the rate of $2,000,000 annually. Recent purchases have averaged $13.53 per pound. "Good stained" was the leading grade in purchases.

MELBOURNE, AUSTRALIA—Australian gold production in 1952 was the highest in 10 years and set an all-time high in value per ounce—$37.00—with most of it sold on the "Free Market."

KUALA LUMPUR, MALAYA—The Pacific Tin Consolidated Corporation produced 2,168 tons of tin in 1952 compared with 1,942 tons in 1951. Current output is below 1952 levels.

NEW YORK—An all-time record daily production rate of 3,300 tons of aluminum was set in the United States in February. Total monthly production of 92,649 tons was also the highest for any February.

LA PAZ, BOLIVIA—The Corporacion Minera Boliviana and Patino Mines and Enterprises Consolidated have reached an agreement concerning tin sales from mines formerly operated by Patino. About five percent of the value of the tin will be paid Patino until approximately $15,000,000 has been received.

WALLACE, IDAHO—Drifting on the 3,000-foot level of the Vulcan-Galena mine has shown a vein 5 to 5½ feet wide assaying 35 to 40 ounces of silver per ton over a length of 500 feet.

HAVANA, CUBA—Freeport Sulphur Company has discovered and developed an important nickel-cobalt deposit at Moa Bay. Plans call for an open-pit mine and first metal production in 1955.

MEXICO, D. F., MEXICO—The steel firm La Consolidada and subsidiary Minas Del Norte have indicated 47,500,000 tons of 64 percent iron ore by diamond drilling. The deposit is 200 miles south of the United States boundary. A railroad may be built to the deposit.

GLOBE, ARIZONA—The Metate Asbestos Corporation and D. W. Jaquays Mining Corporation were the first asbestos producers to sell to the DMPA stockpile here.

LARAP, CAMARINES NORTE, PHILIPPINE ISLANDS—Philippine Iron Mines shipped a record total of 663,395 dry tons of iron ore to Japanese steel plants in 1952.

WASHINGTON—The International Materials Conference reports only molybdenum and nickel remain in short supply and under an allocation program.

LONDON—Production of steel ingots and castings in the United Kingdom in the first quarter was at an all-time quarterly high of 4,552,000 tons.

ERWIN, TENNESSEE—International Minerals and Chemical Corporation's Industrial Minerals Division is increasing special grade feldspar grinding capacity here. A new mill to recover scrap mica has been placed in operation.

SAN FRANCISCO—Free World production of metals has increased since 1950 as follows: copper 10 percent, zinc 24, nickel 26, cobalt 58, tungsten 130, molybdenum 75, and sulphur 16.

BOMBAY—One of the world's oldest and deepest mines has been closed. It is the 9,460-foot-deep mine of the Oregum Gold Mining Co. of India (KGF) Ltd. in Mysore State. Remaining ore will eventually be mined from an adjoining property.

BARRAUTE, QUEBEC—Barvue Mines Ltd's new flotation mill is operating at greater than rated capacity of 4,000 tons per day. Open pit ore is averaging 3.24 percent zinc.

PITTSBURGH—Output of alloy steel in the United States in the first quarter of 1953 was 2,613,241 tons, or 385,000 tons more than in same 1952 period.

LA PAZ, BOLIVIA—The Bolivian government, the United States government, and the Patino Mines and Enterprises have reached an agreement whereby U. S. General Services Administration will buy Bolivian tungsten at $63.00 per short ton unit from Patino mines. Of this $10.00 will be paid to Patino as part nationalization payment and the Export-Import Bank will receive $10.00 to repay its loan for Bolivian tungsten expansion.

MOUNTAIN IRON, MINNESOTA—The Oliver Mining Division of the United States Steel Company has started its new taconite plant. Capacity is 500,000 tons per year of concentrates.

LIMA, PERU—Cerro De Pasco Corporation and Newmont Mining Corporation are carrying on a joint exploration program at the Cuajone copper sulphide deposit. Newmont advanced cash and certain technical assistance for up to a 20 percent interest in property.

REMAC, BRITISH COLUMBIA—Reeves MacDonald Mines, Ltd. has discontinued mining and milling of lead-zinc ore. A shaft sinking program and other development will continue.

MOUNT ISA, AUSTRALIA—All monthly production records were broken by Mount Isa Mines Ltd. in March when 54,000 tons of lead-zinc, and 34,500 tons of copper ore were treated. Metal output was 3,195 tons lead bullion, 1,003 copper, 3,500 zinc concentrate, and 271,575 ounces silver.

JOS, NIGERIA—The Gold and Base Metal Mines of Nigeria, Ltd. is to receive up to £250,000 from the DMPA to increase columbite production from its mines here from 26 tons in 1952 to 150 tons in 1955.

WASHINGTON—The GSA has resumed stockpiling of aluminum after an 18 months lapse.

NASHVILLE, TENNESSEE—Cramet, Inc. has received an Office of Defense Mobilization certificate for fast amortization of 90 percent of $25,740,500 worth of titanium sponge production facilities.

BEAVERLODGE, SASKATCHEWAN—The new 500-ton-per-day uranium mill of the Eldorado Mining and Refining (1944) Limited has been placed in operation on schedule. It will increase Canada's uranium output by 140 percent.

DULUTH—April shipments of iron ore by 64 Great Lakes carriers of the United States Steel Corporation's subsidiary, Pittsburgh Steamship Company, were a record 2,977,000 gross tons of ore.

Kennecott's First Bauxite Venture Under Negotiation

Kennecott Copper Corporation has taken first steps to obtain permission from the government of British Guiana to prospect for bauxite in the Pomeroon sector of Essequibo district.

Dr. James Boyd, Kennecott exploration manager, recently flew to British Guiana to talk personally with Wellesely T. Lord, Lands and Mines Commissioner. When approval is granted, Dr. Boyd said, a geological exploration party will begin prospecting the area.

If established, the venture will be Kennecott's first in the field of bauxite mining. Dr. Boyd also visited Dutch Guiana on the same trip to inspect bauxite operations there.

Bolivia, Patino Reach Preliminary Agreement

A preliminary agreement has been reached by officials of Patino Mines & Enterprises Consolidated and the government of Bolivia on a settlement price for the firm's recently nationalized mines. A Patino officer said the company was to receive 5 percent of the net proceeds from all tin sales for a possible period of 3 years, and $3,000,000 worth of tin concentrates seized by the government in a Chilean port at the time of nationalization.

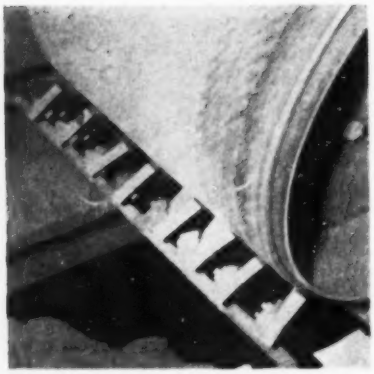
The price to be paid for the properties, plus several minor points, was left for final determination at a later date, but reports indicate that the settlement figure will be between $12,000,000 and $15,000,000.

Canadian Firm To Sell Molybdenite To DMPA

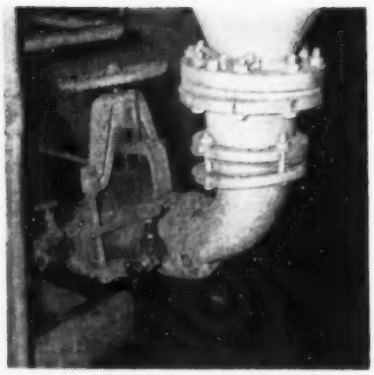
Molybdenite Corporation of Canada, Ltd. has signed an agreement with the Defense Materials Procurement Agency to furnish up to 6,000,000 pounds of molybdnite during the next five years. The United States government will pay the producer's lowest selling price during the two-month period preceding any government call, but has guaranteed the Canadian firm a floor price of 63 cents per pound on 90 percent concentrates for any of its option not bought or for any molybdenite which the company cannot dispose of at a higher price.

The contract also calls for expansion of Molybdenite Corporation's properties at Lacorne, Abitibi-East, Quebec at the company's own expense. A third provision gives the United States government an option on the company's output of bismuth during the life of the contract. This may amount to 450,000 pounds and will be bought at market price.

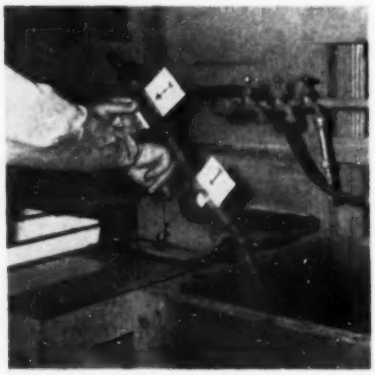
FLOW REGULATOR (circled) allows for precise adjustment of water feed to rod mill. Mr. Vickers, shown here, adapted it from the design of an air regulator in a World War II German pillbox.



CONVEYOR BELT CLEANER is patented by Vickers. Gum rubber blades wipe the belt. First one worked so well that J&L has installed one on nearly every belt at Star Lake.



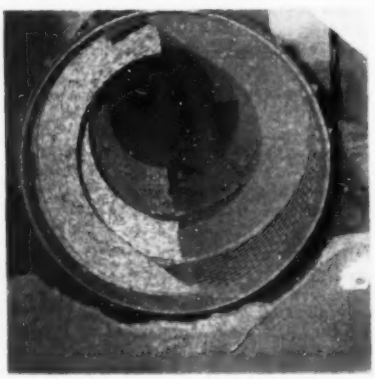
BLOW FLANGE is fitted with a nipple and valve. This pinch valve carries dewatered concentrate. When it plugs, a workman clears it by blowing air or water into the blow flanges on each side.



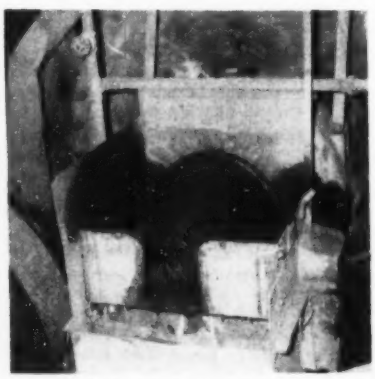
MAGNETITE DETECTOR shows whether the company is losing magnetite in tailing. Small amount of tailing is poured into hole (top arrow); magnetite sticks in glass tube near Dings permanent magnet (bottom arrow).

BOLTS on ball-mill scoop formerly sheared from thrust, had to be replaced frequently. Vickers nearly eliminated the trouble by welding this small butt plate in spot to take the thrust.

RUBBER INTAKE of this pump replaces steel pipe which was in way during repairs. Now, workmen bend 6-foot rubber pipe out of way during repairs.



SPIRAL ejects pieces of oversize, which formerly stayed on grate, wore it out. Result: Grate life is more than doubled.



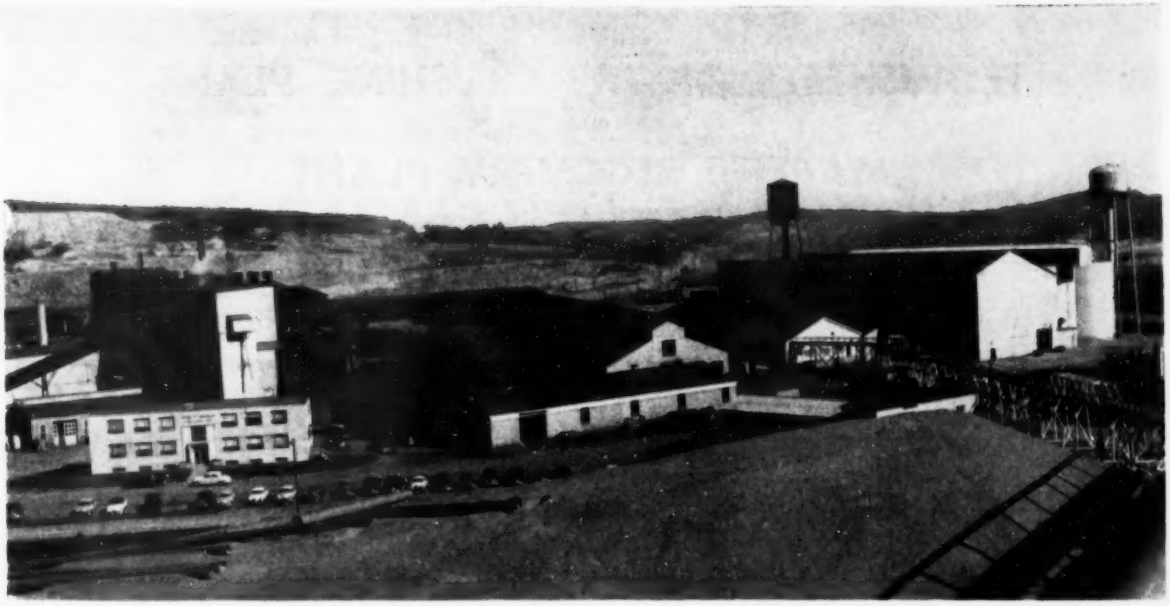
DOUBLE SPIRAL does same job on conical grate. It actually climbs pieces of rock and steel up the hill.

"GOOD MEN LEAVE THEIR STAMP ON EVERYTHING THEY DO"

From one end of the Star Lake mill to the other, you'll see the stamp of W. A. Vickers, mill general foremen.

A few of his ideas are illustrated above. Some, like the conveyor-belt cleaner, are patented; almost any of them could be.

We recommend that our milling readers stop some time at Star Lake and take a guided tour of Mr. Vickers' mill.



Martite plant is on right, in the nearly windowless, cubical building. Sinter plant is on left, and pit in the background.

METALLURGY IS A MINE MAKER

J&L's new martite process more than doubles the value of its iron-ore property at Star Lake, New York: It more than doubles available reserves at Jones & Laughlin Steel Corporation's New York Ore Division, Star Lake, New York. It widens, deepens, lengthens the mineable ore body. It increases the ore-to-waste ratio. It simplifies mining.

Jones & Laughlin's spiral plant at Star Lake, New York recovers non-magnetic martite in iron ore

Briefly, the new plant treats about 2,700 tons of low-grade (23 per cent) nonmagnetic iron ore daily. It produces about 900 tons of high-grade (61.0 to 62.0 percent) iron concentrate which goes to a new sintering plant. Sintered concentrate then goes by rail to the company's steel mills at Pittsburgh, and Aliquippa, Pennsylvania; and at Cleveland, Ohio.

Process Makes Mine

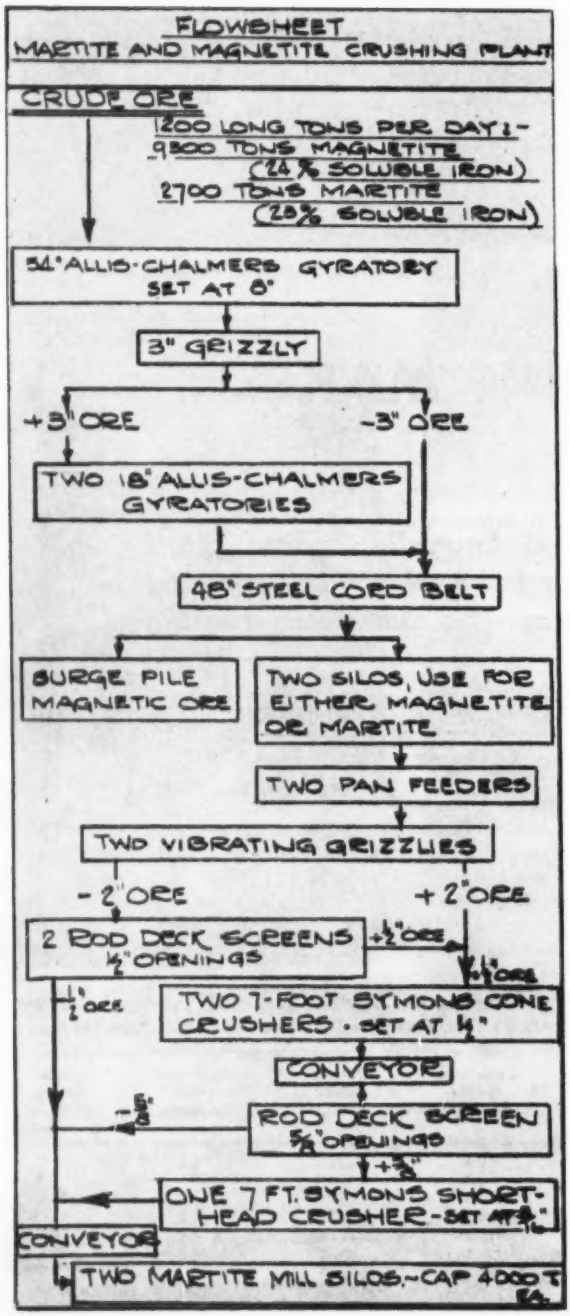
Here's why the martite plant fits so importantly into the Star Lake operation. In the pit, there are two valuable iron minerals—magnetite and hematite. In ore from one part of the pit, the recoverable iron may

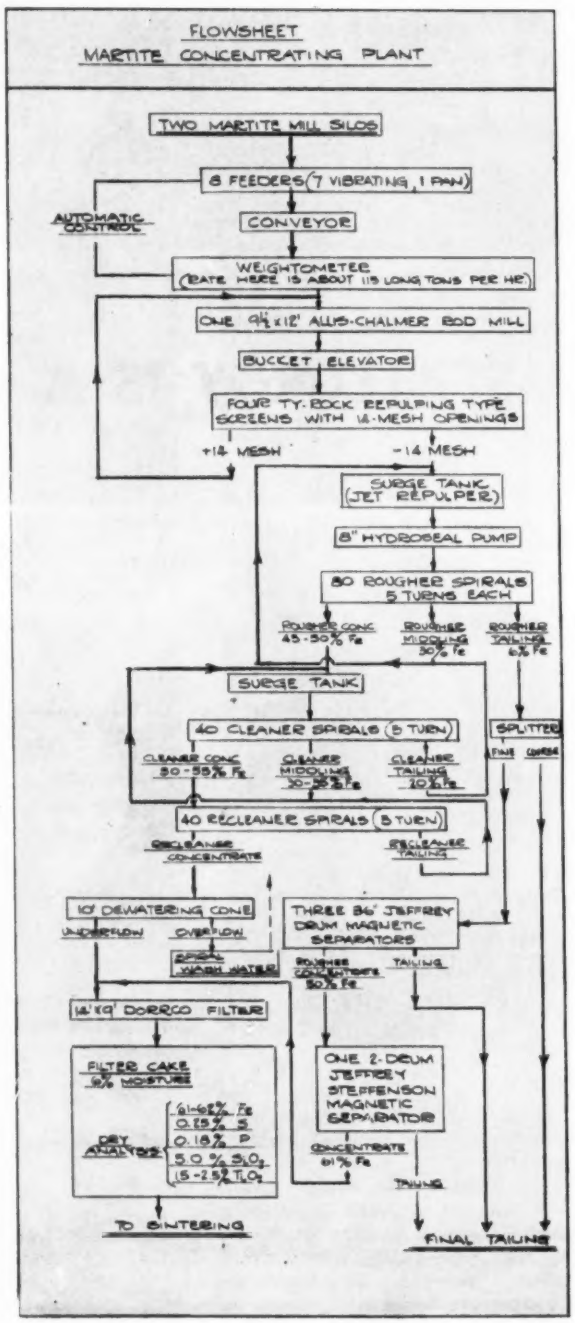
Screen and Chemical Analysis of Typical Martite Concentrate Produced at Jones & Laughlin Steel Corporation's New York Ore Division, Star Lake, New York

Mesh	*Percent by Weight*	*Cumulative Percent by Weight*	*Percent Soluble Iron*	*Soluble iron Percent Distribution*	*Cumulative Percent Soluble Iron Distribution*
+ 14	0.5	0.5	59.63	0.6	0.6
+ 20	6.8	7.3	64.69	7.1	7.7
+ 28	14.2	21.5	65.13	14.9	22.6
+ 35	19.7	41.2	64.61	20.5	43.1
+ 48	22.5	63.7	61.76	22.4	65.5
+ 65	15.4	79.1	58.30	14.2	79.7
+ 100	11.1	90.2	57.68	10.3	90.0
− 100	9.8	100.0	61.88	10.0	100.0

FLOWSHEETS OF THE CRUSHING PLANT
and
MARTITE RECOVERY PLANT

Jones & Laughlin Steel Corporation's
New York Ore Division, Star Lake, New York





be all magnetite; from another part, it may be all hematite; but from most zones, it is a mixture of the two. J&L has been mining and beneficating the magnetite ore for several years, and has been recovering the magnetite in a conventional magnetic plant. But until the martite plant was built, the nonmagnetic portion was left in place.

On the basis of whether the ore can be best treated magnetically or nonmagnetically, J&L management classifies it as follows:

Magnetite is ore in which less than 17 percent of the contained iron is nonmagnetic (and thus more than 83 percent is magnetic).

Martite is ore in which more than 17 percent of the contained iron is nonmagnetic. The mineral martite (from which the ore gets its name) is hematite, which was formed by oxidation of magnetite but still retains the crystal structure of magnetite. The term martite is used locally to describe the nonmagentic ore, although there is no definite proof that the bulk of it ever went through the magnetic stage.

Pit operators can keep the two types of ore separate. They occur in predictable zones—sometimes side by side, sometimes one on top of the other. There's about the same reserve tonnage of martite as magnetite.

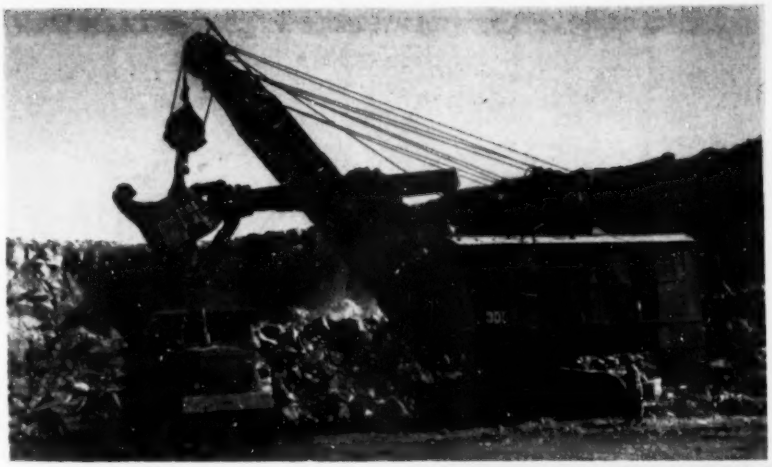
Three Tons for One

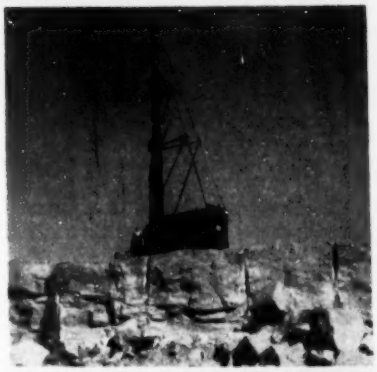
Though the New York Ore Division sells its ore to the parent company, it does so on a competitive basis. And it's a remarkable thing that J&L can produce concentrate at competitive prices from the low-grade Star Lake ore. Magnetite ore averages about 24 percent soluble iron; martite ore averages 23 percent soluble iron.

A shovel operator in the pit tells about the lowness of grade in this way: "The ore looks just like ordinary rock."

But to W. R. Webb, manager of the New York Ore Division, it means this: "To deliver a ton of sinter to Pittsburgh, we have to mine and beneficiate three tons of this hard ore. Then we have to sinter the concentrate and ship it to Pittsburgh by rail. That means that our big battle all the way is cost, and it means that permissable cost for each operation is very low."

Except that Star Lake ore has a coarser size of liberation (20 mesh for magnetite, 14 mesh for martite), it is quite similar to the taconites of Minnesota and Michigan. The Star Lake ore is actually a little lower in grade.

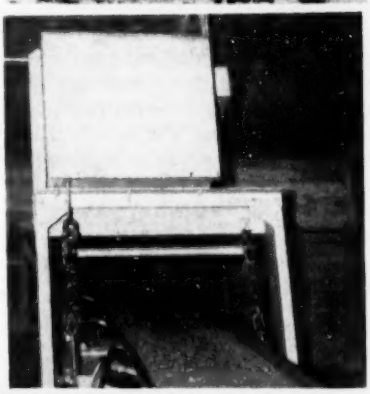




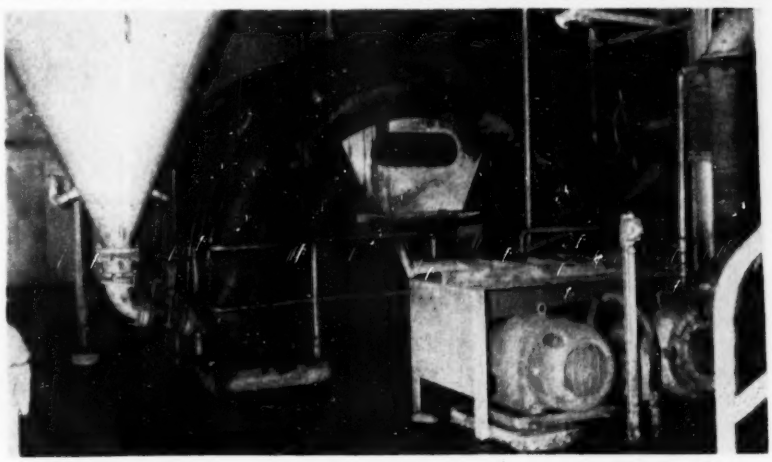
ABOVE: Pit team: Marion shovel loads out 22-ton Euclid. Each shovel loads about 3,000 tons of crude ore per shift. RIGHT: Churn drill (Bucyrus-Erie 42-T) bangs away on the east side of the north pit. Drills are equipped with 9-inch, 4340 chrome-nickel-molybdenum bits. In hard Star Lake ore, bits average 10 feet per dressing; rigs average about 30 feet of hole per shift.

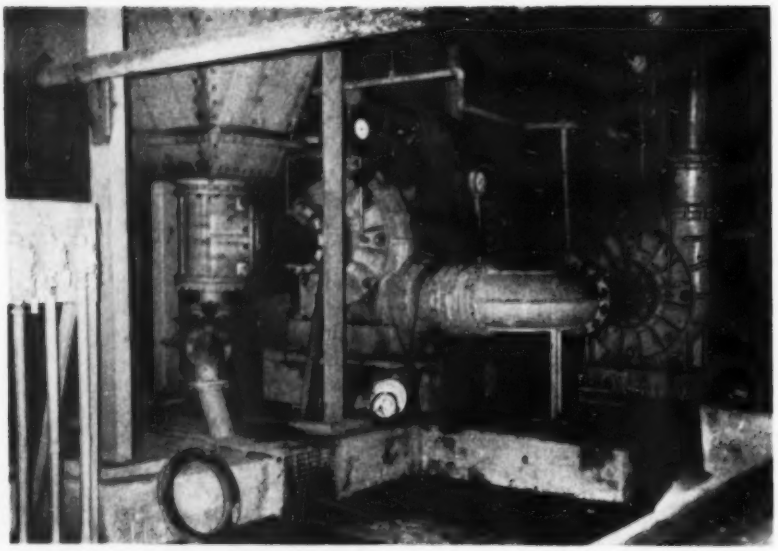
Successful operation of the martite plant gives J&L a tremendous tonnage of reserves. The main ore structure is about 2½ miles long, and 400 to 1,600 feet wide; it will be mined to a depth of about 500 feet. It is twisted (post mineral) like a big ribbon, and in total it averages about 25 per cent iron.

J&L's geologist, Fred West, describes the ore as a "Grenville gneiss which was granitized and enriched with iron minerals." He says "we believe that the magnetite came in as a metasomatic replacement following granitization."



RIGHT: This Merrick Weightometer records feed to the rod mill, and operates in an automatic feed-control system (see flowsheet). BELOW: Dewatered concentrate flows directly from the 10-foot cone (left) into the 14 by 9 foot Dorrco filter (right). Potentially troublesome pipe is thus kept short and inclined.





Four-way taper on tailing feed box (upper left) leaves no place for sand to settle. Two pumps in series are 12-inch Hydroseals; speed of the first can be adjusted by means of American Blower variable speed drive.

The hangingwall is sharp, clearly defined; a granitized gneiss (waste) meets a disseminated garnet gneiss (ore). The footwall is not apparent to the eye; it's an assay footwall in a blotchy garnet gneiss.

Simple Flowsheet

The pit produces about 9,000 tons of magnetite ore daily and 2,700 tons of martite ore. Both ores are run though the same crushing plant, but at different times. The martite plant (see flowsheet) actually begins with two martite mill silos which together hold 4,000 live tons of crushed ore.

The ore is rod-milled and screened to minus-14-mesh, and the iron content is recovered in three stages of Humphreys spirals. Eighty rougher spirals have five turns each; 40 cleaners have five turns each; 40 recleaners have three turns each. The concentrate is dewatered, filtered, and sent to the new sinter plant.

The martite process is simple. The important thing is that it does the job economically, within the narrow cost limits imposed by low iron content of the ore.

Here's a typical percent analysis of the concentrate: Iron, 61 to 62; sulphur, 0.25; phosphorus, 0.18; SiO_2, 5.0; TiO_2, 1.5 to 2.5; moisture, 6.0.

The concentrate is slightly high in phosphorus, and so is a non-Bessemer grade. (The magnetite concentrate is of Bessemer grade.)

Here's Some Good Advice

Recovery is 82.5 percent of soluble iron in the feed.

According to J&L's plant metallurgist, R. E. Durocher, "the success of this process depends largely on feeding a properly sized product to the spirals. Spirals will not work efficiently on minus-150-mesh martite; and they lose efficiency rapidly below 100-mesh. We control the grinding operation to present a minimum of minus-100-mesh material to the spirals."

A screen and chemical analysis of typical martite concentrate is shown in attached table.

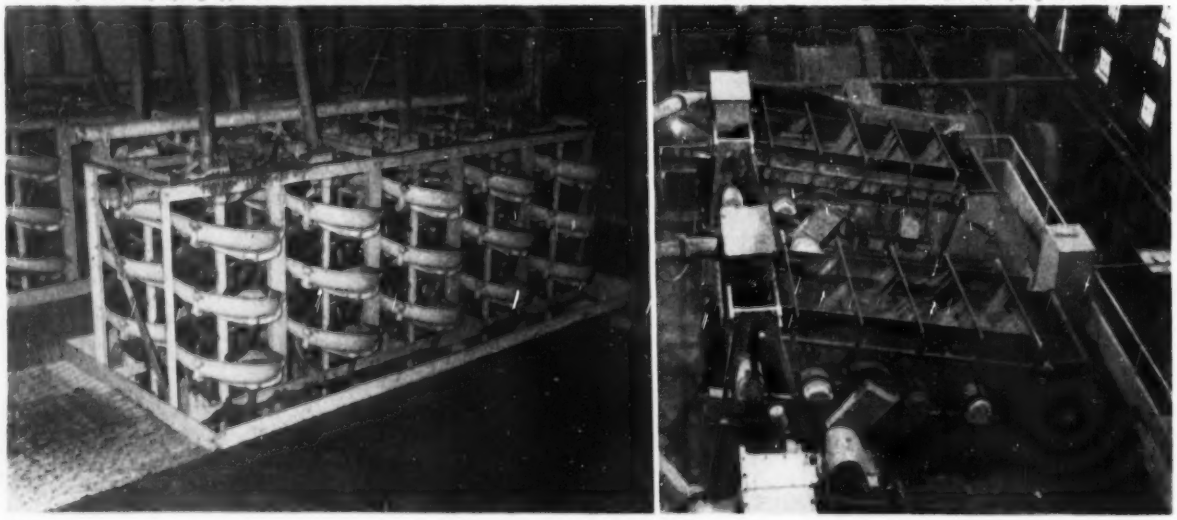
Keeping costs down means keeping tonnage up. Getting high throughput from the 9½- by 12-foot rod mill requires a high rod charge —about 45 percent of mill volume. The charge is 4-inch rods.

Pulp dilution has an important effect on grinding efficiency. Dilute pulp means low efficiency—low throughput. So feed to the mill is kept at about 80 percent solids.

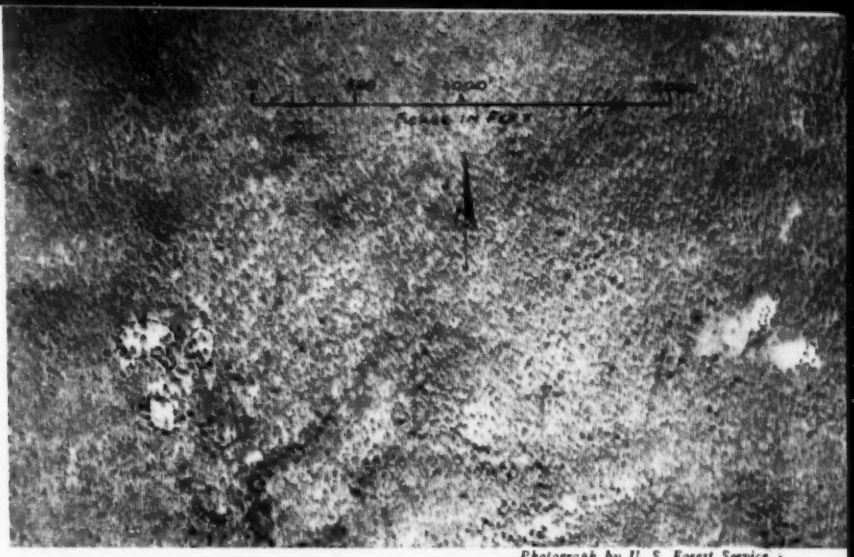
Expansion to Come

The new martite plant is now producing about 300,000 tons of concentrate per year. That's just a beginning. There'll be additions in the future. Eventually, Star Lake will probably be geared for equal production of martite and magnetite. There's plenty of time. As W. R. Webb says, "this operation will probably be bigger than ever 50 years from now. We've got enough ore in our present pit to last that long. And there are low-grade iron occurrences all over this district."

LEFT: Spirals are arranged in groups so that each spiral is accessible. These three-turn spirals are recleaners. RIGHT: Final sizing units are four Ty-Rock repulping-type screens. Feed comes to them from the rod mill. Undersize (minus-14-mesh) goes to a jet-repulping system.



Mine superintendent Glen Hawe (left) and pit foreman Ole Oney check a 50-ton shipment of fluorspar ore at Darby, Montana. This pit-run ore contains over 95 percent CaF_2.



Photograph by U. S. Forest Service ▸

This aerial photograph was taken in 1936 and shows the prominent natural outcrops of fluorite on Crystal Mountain before their discovery. The shape of the ore bodies, as now known, is outlined by dotted black lines.

MONTANA'S CRYSTAL MT. FLUORITE DEPOSIT IS BIG AND HIGH GRADE

Two prospectors first found outcrop in 1936, did not know value until 1951, but by end of 1952 open pit production was 200 tons of 95% CaF_2 ore daily

By John W. Taber*
Consulting Mining Geologist
Spokane, Washington

One year from the staking of a raw prospect, Montana's first important fluorite discovery on Crystal Mountain became the nation's largest single fluorspar producer. Moreover, exploration and development to full-scale mining of these interesting and unusual fluorite deposits actually was accomplished in less than four months' operating time. Such statements ordinarily might imply a noteworthy engineering achievement. The fact is, however, that development of the deposits was mainly a routine job of access road building and minor stripping preparatory to opening the first pit. Investment cost was normal for the size and nature of the operation, and success of the enterprise was assured at the beginning.

Exploration in the usual sense was hardly necessary at Crystal Mountain except to prove that the seemingly too large, too high-grade, and too conspicuous fluorite outcrops were no mirage. A certain amount of preliminary testing had to be done mainly to dispel pessimism. Thereafter, for future development planning, only a routine program of systematic drilling was required.

Capitalizing on an Error

The peculiar outcrops on Crystal Mountain, in Ravalli County, Montana, were first noticed in 1936 by A. E. Cumley and Lester Thompson while building trail for the United States Forest Service. Actual recognition of the fluorite did not occur, however, until 1951 when the two veteran Montana woodsmen first became interested in prospecting.

Specimens of green beryl and barite in a mineral collection displayed as a novelty in Darby, Montana attracted Cumley's and Thompson's attention. They thought these specimens resembled the mineral in the large outcrops on Crystal Mountain. Upon learning the value of beryl, the two partners immediately took off into the hills to stake their "beryl" claims. Soon afterward, specimens sent by Thompson to the Bureau of Mines were identified as high-grade fluorite.

At Thompson's request, the Bureau sent engineers to investigate the discovery late in 1951. Preliminary bulldozer trenching and sampling by Bureau engineers established sufficient facts, just before the onset of winter, to prove the unusual grade and size of the outcrops. The property was not again accessible until May 1952.

By early summer of 1952, Cummings-Roberts, mining contractors of Compton, California, completed supplementary exploration of the deposits and signed a long-term lease with the owners.

Road construction, the major development work required, was commenced by Cummings-Roberts in August. Seven miles of access road were constructed by early September, simultaneously with completion of the preliminary stripping of the south outcrop. Ore trucks began to roll immediately. Within the first week, a 200-ton daily production of high-grade ore was routine.

After the Crystal Mountain discoveries were made, the surrounding area was combed for many miles in search of other fluorite deposits. Aerial photographs and airborne geophysical equipment were

* *Consulting mining geologist, Spokane, Washington, B. S. in mining geology Washington State College 1941. Has been an exploration engineer, examining engineer, and chief of Region II mining methods branch of the U. S. Bureau of Mines. Has been employed as a mine superintendent and exploration geologist in Brazil, Alaska, and the Pacific Northwest. Is the author of various Bureau publications on mineral exploration.*

Allen Photograph, Missoula, Montana

A. E. Cumley (left) and Lester Thompson, discoverers of the Crystal Mountain fluorite deposits, again prove that it's the prospector who finds unknown ore bodies.

used in the search. Both clearly indicated all of the Crystal Mountain ore bodies, but were disappointingly unsuccessful in indicating any unknown deposits. The Crystal Mountain deposits are, in fact, so conspicuous that almost everyone in the upper Bitterroot country who has traveled Sleeping Child trail remembers noticing the pretty crystals where the Forest Service rail crosses one of the outcrops.

Bureau Spotlights Discovery

Speedy exploitation of the Crystal Mountain deposits was possible mainly because nature already had done a remarkably good job of preparing them for open-pit mining. The U. S. Bureau of Mines, prompted by a critical domestic fluorite shortage and the growing need for new western sources, also was instrumental in stimulating their quick development. The first maps, sampling of the deposits, and preparation of a report (R.I. 4916)[1] were under the direction of M. E. Volin, chief of the Mining Division, Spokane office of the Bureau. This work pointed out the unique features of the deposits soon after discovery and influenced both the owners and a competent aggressive mining company in joining to bring about immediate development commensurate with the potentiality of the deposits.

Physical and Geologic Features

The fluorite deposits on Crystal Mountain are neither exceptionally large by comparison to other ore deposits, nor is their mining an impressive open-pit operation. The deposits are outstanding because of their uniform high grade. They are novel for lode mining because of the broadside surface exposures so ideally situated for quick easy extraction. The ore bodies are of special interest from the geologic standpoint because of certain structural features which imply a complex mode of origin. It would be premature to attempt a discussion of structural control and origin of the deposits at this time but the geological aspects are being studied as mining progresses.

The largest ore body is about 180 by 270 feet and roughly rectangular in plan. It lies like a slightly tilted cap rock occupying the top two-thirds of a ridge prominence. The granite footwall of this ore mass has been exposed all around the sides of the outcrop knob.

Five other similar fluorite outcrops in two principal groups are known. Sizes of these range down to 20 by 60 feet in plan. These outcrops similarly form the crest or side slope of individual ridge prominences. The deposits appear to be remnants of low-angle tabular ore bodies left at the crests of the ridges because of their greater resistance to erosion than the granitic country rock.

The ore-capped knobs are situated along a principal divide in deeply dissected mountainous terrain. Natural outcrops of the fluorspar are smoothly rounded with no soil and little overburden. A thin cover of loose gravel spar scattered over most of the main ore masses blends inconspicuously at the sides with the surrounding weathered granitic soil and overburden. Although the ore bodies ultimately were proven to have sharp-walled contacts with the granitic country

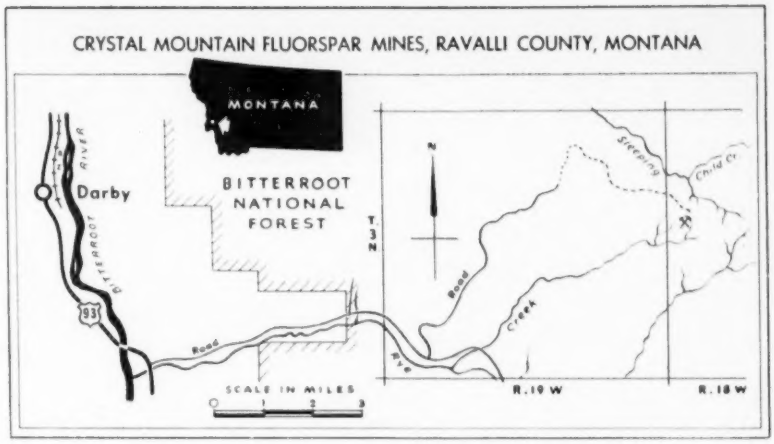
Half-yard P. and H. shovel loading one of seven tandem drive GMC trucks used to haul ore to the railroad at Darby.

Allen Photograph, Missoula, Montana

1. Tabor, John W. *Crystal Mountain Fluorspar Deposits Ravalli County, Montana*, U. S. Bureau of Mines, R. I. 4916, October 1952.

rock, the walls of the ore bodies were not apparent at the surface. Outlines of all the ore bodies could not be determined until traced by bulldozer trenches.

The ore bodies are nearly pure masses of coarse granular crystalline fluorite cut by numerous granitic dikes. Gangue minerals interlocked with the fluorite crystals are orthoclase feldspar, biotite, and a trace of quartz. Throughout most of the deposits, the gangue minerals comprise less than 5.0 percent of the ore by weight. Most of the fluorite is faintly purple-colored but pale green patches are common. Crystal sizes range from 0.1 to 1 inch. The gangue minerals, generally smaller in size, are quite evenly disseminated throughout the ore.



Exploring the Deposits

First exploration was done by bulldozer trenching and channel sampling. Later, the surface work was supplemented by drill hole sampling at grid-spaced intervals. Drill hole sampling was done with a 45-pound Jackhammer drilling dry with tungsten carbide insert bits using single-piece and jointed steel in lengths of 3 to 16 feet. Air was supplied by a small wheel-mounted compressor. The same equipment was used for mining. Vertical prospect holes up to 38 feet deep were drilled successfully with jointed steel. Average depth of the vertical drill holes for both sampling and mining has been 15 feet.

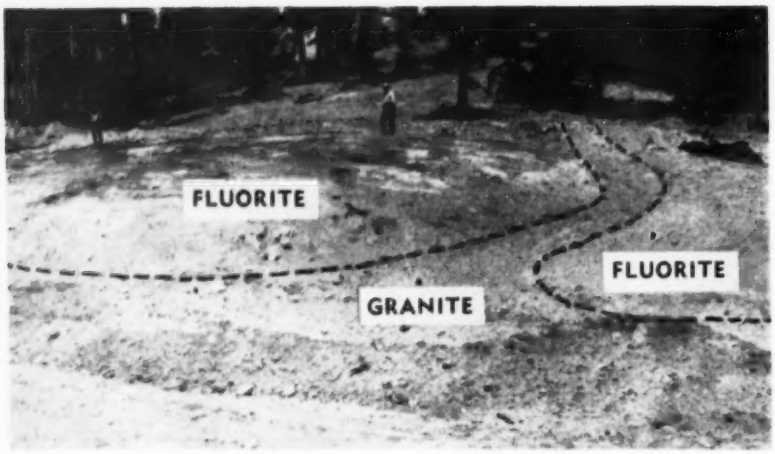
Drill-cutting samples were collected in a circular sheet iron pan welded to a stub casing for inserting into the collar of the drill hole. A tapered sleeve-type air bag clamped to the rim of the sampling pan served to check and retain dry drill-cuttings blown from the drill hole. This sampling device was highly satisfactory for both simplicity and efficiency.

Samples of the drill cuttings were taken through three-foot intervals when in ore. Sample recovery was 90 percent or better in solid-wall holes up to 15 feet deep. The percentage of recovery fell off gradually in holes deepened below 15 feet. This sample loss in the deep holes was attributed to a combination of insufficient blowing capacity through standard drilling equipment used and restricted hole clearance caused by rod coupling shoulders of the jointed steel.

Mining and Transportation

Mining in the single face open pit so far has proven to be a simple operation. Ore is broken by vertical-hole slab rounds both with and without toe holes. The ore breaking is done on company time by a crew consisting of a pit foreman, a miner, and a helper. This crew had no trouble breaking ore for a production of 200 tons per shift, and

Looking down on the south open pit after 16,000 tons of high-grade fluorite had bee nmined. The top of shovel can just be seen over top of broken ore. Four loaded trucks are ready to start for Darby.



Natural surface of the south outcrop showing the bulldozer trench which outlines the fluorite-granite contacts. The south open-pit mine was started at this outcrop.

later, as the pit face was developed, to 250 tons.

In mining the south ore body, jointing tended to produce large rhombohedral blocks from overbreak. Inasmuch as specifications for the ore limit maximum lump size to 1 foot, these blocks of ore occasionally require secondary breaking which is done by plaster shots and doublejacking.

Loading and trucking the ore to the rail point at Darby is done under contract by E. G. Smith of Osborn, Idaho. Equipment used for the job is a half-yard, truck-mounted shovel and a fleet of 7 tandem-drive dump trucks. Five to six trucks were kept in operation from the beginning. Each truck made three trips daily averaging 13 tons per trip on the 26-mile haul to Darby.

Production Problems

The only real production problem at Crystal Mountain for the present is maintaining access to the deposit. The mine is at 7,000 feet altitude in an area of frequent winter storms and snowfall sufficient to make winter hauling difficult. Although it would be possible to operate throughout most of the winter, it has not yet been considered practical to do so. In 1952, mining was discontinued in late December.

The ore body which was mined in 1952 is unusually free of granitic dikes such as are common to most of the other ore bodies. Only one dike 4 to 6 feet wide cuts the working face. This dike is decomposed to a soft granular earth which mingled so readily with broken ore that some dilution could not be avoided. Because the dilution was not enough to lower the run-of-pit grade to anywhere near minimum requirements, it has not been a matter of concern. However, the other ore bodies are known to contain many more similar dikes. These dikes in certain areas may comprise as much as one third of the body to be mined. Undoubtedly these areas will require much more selective mining and considerably more waste hauling from the pits than was necessary in the 1952 operation.

Future Outlook

The entire 1952 fluorite production from Crystal Mountain was shipped to the Columbia-Geneva Division of the United States Steel Corporation for use and stockpiling at its plant near Provo, Utah. Some thought has been given to milling the ore to produce acid-grade fluorspar but no definite plans have been made for mill construction in the immediate future.

Laboratory metallurgical testing of the ore indicates that an acid-grade product can be obtained easily by simple gravity concentration with an 80 percent recovery. Better overall recovery could be achieved by floating the gravity tailing.

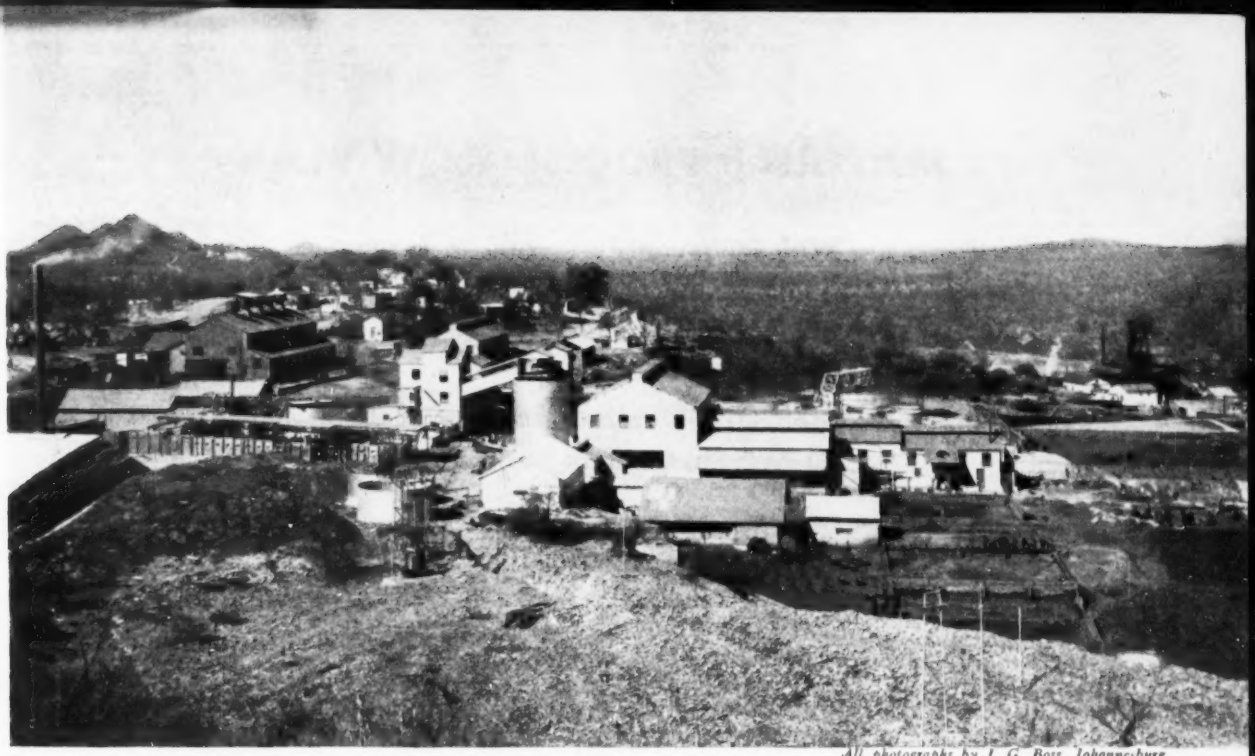
Although development of the Crystal Mountain fluorite deposits is still too new to predict their future, they already have made valuable contributions to the mineral industry. In the short time since mining was begun, the new fluorite production has appreciably eased the short supply of western metallurgical fluorspar. The discovery has called attention to an area heretofore considered totally lacking in valuable mineral deposits. Although no similar fluorite deposits have yet been found in the area, recent investigations have led to the discovery of several new uranium prospects and a monazite deposit.

The new focus of attention on fluorite in western Montana and the Idaho Batholith area has turned up several fluorite prospects in other districts. Interest also has been revived in developing another apparently large Idaho fluorspar deposit known for many years but hitherto considered too inaccessible for profitable exploitation.

Prospector Still Essential

Last but not least, the circumstances of the Crystal Mountain discovery and its quick development to a productive mine should be heartening to the all too few prospectors who still go out with the hope to "strike it rich." Crystal Mountain is proof that the prospector is today just as essential as ever to the mineral industry and that the chance of reward still exists for the alert and persistent modern "rock hound" who has the perseverance to get out and comb the hills once more.

Face of south open-pit mine. Men on top of the bench are loading holes. Nearly all the stripped area in background is ore.



All photographs by J. G. Boss, Johannesburg.

The antimony-gold mill of the Consolidated Murchison (Transvaal) Goldfields and Development Co., Ltd. at Gravelotte, Union of South Africa, looking east. The buildings from left to right are the power plant, crushing plant, fine ore bins, flotation plant, antimony concentrate sumps, and drying floors. In the right background is the mine office and Weigel shaft. The pointed hills (koppies) at top left are the sites of the Banded Ironstone and Freestate gold mines.

WORLD'S RICHEST ANTIMONY MINE

Is that of Consolidated Murchison in South Africa whose ore runs 14 percent antimony which is recovered by modern flotation mill with gold as byproduct

Antimony is one of the few metals whose use by man preceded 4,000 B. C. Early uses were largely ornamental but today antimony is considered as a strategic metal.

Antimony is found in many parts of the world, mostly in small, irregular, scattered deposits so that when one mine can and has produced 28 percent of all the antimony mined in one year (1951) in the Free World, that mine is of great interest to the mining world.

The mine is the Gravelotte, owned and operated by the Consolidated Murchison (Transvaal) Goldfields and Development Co. Ltd. and situated in the eastern part of the Transvaal, Union of South Africa. The Johannesburg Consolidated Investment Co. Ltd. acts as consulting engineers for the firm.

Flexible Operations

The present Murchison company was formed in 1934 to acquire and consolidate under one management several small gold and antimony mines along what is known as the "antimony line" of the Murchison Range. Initially, gold was the only metal the company was interested in; the stibnite found in the gold-stibnite ores was not recovered and formed part of the tailing. At that time, stibnite was not an ore mineral because it could not be produced at a profit even as a byproduct of gold production. It was not until World War II when antimony increased in price due to the war demands and Japanese control of the important Chinese antimony deposits that the Murchison antimony was of any value. From that time about a year ago the company was primarily an antimony producer with gold as the byproduct.

Fortunately for the firm, it is possible to produce either antimony-gold ore or gold-antimony ore from different mines so that operations can be varied to mine the ore of greatest value at the existing metal prices. The mill was designed and built to treat either of the two types of ores by making only minor changes which require only 48 hours to carry out.

Primary interest in the Murchison is in its antimony mining and milling and these will be described first. Recent changing of emphasis to gold production and reopening of the Banded Ironstone mine will subsequently be discussed.

Four Types of Mineralization

In the Murchison Range schist belt, four types of mineralization occur. It is considered as hypothermal. Post mineral dikes have displaced the veins in many places.

The first type is a mineralized zone with no sharply defined boundaries and which may or may not be associated with quartz veins. In this zone, gold values are erratic with pyrite, pyrrhotite, arsenopyrite, and tourmaline usually present.

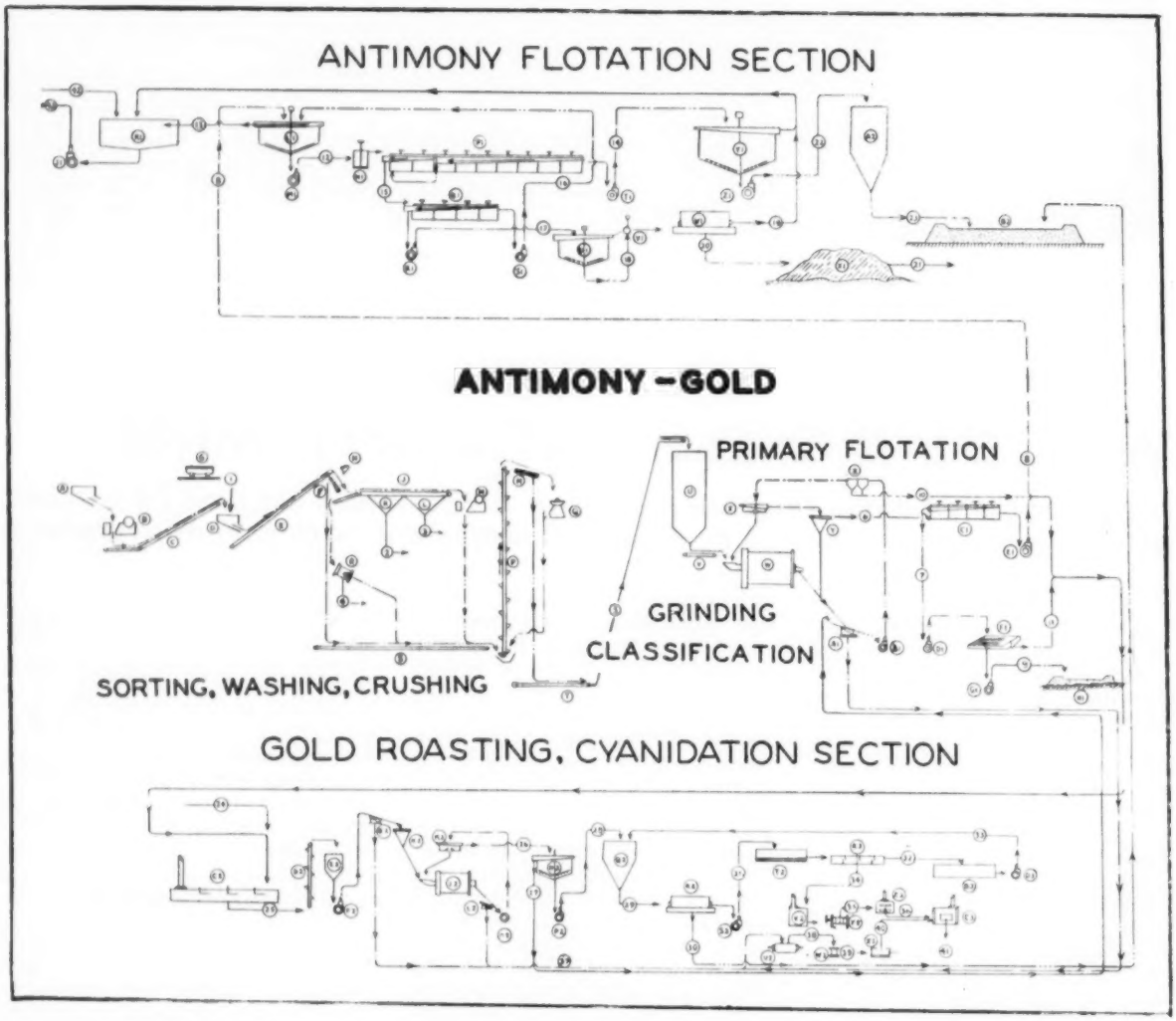
A second type of mineralization

MATERIAL PROCESS FLOW PLAN

With Equipment Types and Description

ANTIMONY-GOLD MILL

Consolidated Murchison (Transvaal) Goldfields and Development Co., Ltd.
Gravelotte, Union of South Africa



MATERIAL PROCESS FLOW PLAN
(Indicated by sequential numbering 1 to 43)

1. Run of mine ore.
2. Sorted waste.
3. Sorted and cobbed ore.
4. Ore washings to mill circuit.
5. Mill feed.
6. Final pulp.
7. Gold flotation concentrate.
8. Gold flotation tailing to thickeners.
9. Gravity tailing to low-grade stockpile.
10. Jig concentrate to roaster.
11. Gravity concentrate to roaster.
12. Thickener underflow to antimony flotation.
13. Thickener overflow water to tanks.
14. Flotation tailing to final thickener.
15. Cleaner concentrate to recleaner cells.
16. Recleaner tailing to flotation feed.
17. Final antimony concentrate to thickener.
18. Thickener underflow to rotary filter.
19. Filtrate to water tanks.
20. Antimony concentrate to stockpile.
21. Antimony concentrate to bagging.
22. Thickener underflow to Browns tanks.
23. Final tailing to dam.
24. Low grade concentrate to roaster.
25. Roaster calcine to regrind circuit.
26. Calcine pulp to thickener.
27. Thickener overflow to circuit.
28. Thickened calcine pulp to Crosse tanks.
29. Crosse tank discharge to rotary filter.
30. Residue to slime dam.
31. Unprecipitated solution to clarifiers.
32. Solution to zinc boxes.
33. Precipitated solution to Crosse tanks.
34. Zinc-gold to acid vat.
35. Gold sludge to calcining furnace.
36. Calcine to reverberatory furnace.
37. Corduroy concentrate to amalgamation.
38. Amalgam to press.
39. Amalgam to retort.
40. Retorted gold to reverberatory furnace.
41. Gold bullion as fine ounces.
42. Make-up water.
43. Water to plant.

is not sharply differentiated from the first, and consists of zones of rock fractures mineralized with quartz and sulphides. The best example is the arsnopyrite of the Banded Ironstone mine.

Usually to the south of the first two types is the third type consisting of stibnite-bearing veins. In general, this type is continuous, but the individual veins are lenticular. They consist of coarsely grained, crystalline, ankerite carbonates and a network of quartz veins in carbonate rocks, and chlorite schists. The stibnite occurs in massive form in veins and stringers in the quartz carbonate rocks, and often carries visible gold in rounded quartz fragments. Other minerals include tetrahedrite and cinnabar, the latter in small lenticular bodies.

The fourth type consists of more or less defined quartz bodies carrying sulphides and gold. This type is often associated with the stibnite veins.

Prospect Drilling

Because of the lenticular habit of the veins, particularly so along the strike, prospecting by trenching and shallow surface shafts has been supplemented by cheaper diamond drilling. Surface indications have proven to be a poor guide as to what may be found in depth so diamond drilling is also used extensively underground to test vein extensions on the strike, down dip and in the search for parallel veins or structures, and also to pick up faulted segments or sections displaced by dikes.

The mineralized areas have been found to occur in close proximity to the serrated hills (kop or koppies) formed by the resistant outcroppings of quartzite and quartz schists. The veins all outcrop in the southern slopes of the hill and more or less conform to the length of the hill. The vein and mine names are the same as the hill names. (See included map for mine locations.)

Gravelotte Mine

The Gravelotte mine is the world's largest high-grade antimony mine and it has been the source of Murchison's antimony production in recent years. Operating experience and company records show that it is possible to produce 11 to 14 percent antimony and 0.10 ounce gold per ton ore over a sustained period of time. On a three-shift basis, 400 to 450 tons of ore can be hoisted.

Summary of operations For 1951 Treating Antimony Ore From Gravelotte Mine

Short Tons	*Gold Content*	*Antimony Content*
ORE		
166,560 mined		
160,742 milled [1, 2]	0.165 ounce heads	11.59 percent heads
COBBED ORE AND CONCENTRATE		
27,503 shipped		61.94 percent [3, 4]
GOLD BULLION		
9,834 fine ounces shipped [4, 5]		

1. 6,168 tons waste hand-sorted out. 2. Mill operated 250 days. 3. Antimony recovery 91.41 percent. 4. Mill tailing assayed 1.00 percent antimony and 0.10 ounce gold. 5. Gold recovery 37.11 percent.

Depending, of course, on ore grade, this tonnage will yield a maximum of 20 short tons of hand-cobbed ore (almost pure stibnite Sb_2S_3 67.0 percent antimony) per day. In contrast to the other Murchison mines where both walls are schist, the Gravelotte mine has a schist footwall and a quartzite hanging wall. However, one footwall split of the vein has schist for both walls.

Shaft With No Headframe

The mine is developed by the 1,425-foot-deep, two-compartment, concrete-lined, vertical, rectangular, Gravelotte shaft which is 7 by 13 feet inside the lining. Hoisting is done by a 250-hp double-drum Fulton electric hoist. In the true sense there is no headframe over the shaft. The shaft is sunk from a sloping hillside into which two adits were driven and joined to form a looping tunnel. All men, caged cars, and supplies are loaded and unloaded from cages at a station reached through the tunnel. Top portion of the shaft, above the tunnel, serves as a headframe with the sheave wheels mounted over the shaft on the hillside. The hoist building is down the hillside from the sheaves. All hoisting is done on

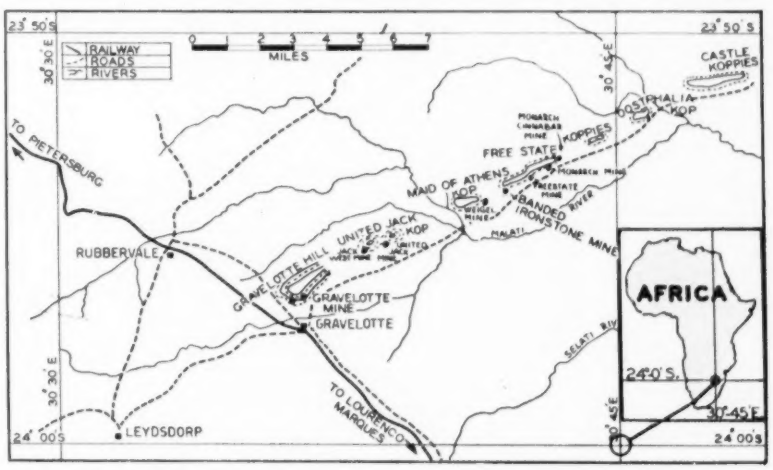
EQUIPMENT TYPES AND DESCRIPTION
(Indicated by sequential lettering A to D3)

A. Ore bin.
B. Jaw crusher.
C. Conveyor belt.
D. Ore pocket.
E. Conveyor belt.
F. Grizzly.
G. Ore car on endless haulage rope system.
H. Water sprays.
J. Sorting belt.
K. Waste bin.
L. Cobbed ore bin.
M. Jaw crusher.
N. Vibrating screen.
P. Bucket elevator.
Q. Keanedy cone crusher.
R. Washing trommel.
S. Belt conveyor.
T. Main mill belt conveyor.
U. Ore bins.
V. Belt feeder.
W. Ball mills.
X. Spiral classifiers.
Y. Cone classifiers.
Z. Jigs.

A1. Corduroy tables.
B1. Pumps.
C1. Gold flotation cells.
D1. Pumps.
E1. Pumps.
F1. Concentrating tables.
G1. Pumps.
H1. Low-grade stockpile.
J1. Water pumps.
K1. Water tanks.
L1. Thickeners.
M1. Pumps.
N1. Conditioners.
P1. Antimony rougher flotation cells.
Q1. Antimony cleaner flotation cells.
R1. Pumps.
S1. Pumps.
T1. Pumps.
U1. Thickeners.
V1. Diaphragm pumps.
W1. Rotary filter.
X1. Antimony concentrate stockpile.
Y1. Thickeners.
Z1. Pumps.

A2. Browns tank for measuring tonnages.
B2. Slimes dams.
C2. Edwards roaster.
D2. Bucket elevator.
E2. Mixing tank.
F2. Pump.
G2. Corduroy tables.
H2. Cone classifier.
J2. Ball mill.
K2. Spiral classifier.
L2. Corduroy tables.
M2. Pumps.
N2. Thickener.
P2. Pumps.
Q2. Crosse tanks.
R2. Rotary filter.
S2. Filtrate pumps.
T2. Clarifiers.
U2. Amalgam barrels.
V2. Acid vat.
W2. Amalgam press.
X2. Retort furnace.
Y2. Filter press.
Z2. Calcine furnace.

A3. Zinc boxes.
B3. Precipitated-solution pumps.
C3. Reverberatory furnace.
D3. Pumps.



Surface plant at the Gravelotte mine. One portal of the tunnel leading to the main shaft station is at the left. All ore, men, and supplies reach the shaft through the tunnel. The large white building to right of portal houses the hoist. The shaft has no headframe and the hoisting cables extend up the hillside to the left and over sheaves mounted on the hill slope at the top of the shaft.

two 4- by 6-foot cages running on wire rope guides. Hoisting cable is ⅞-inch diameter. Ore is hoisted at a speed of 830 feet per minute in 24-cubic-foot mine cars, each holding 1¼ tons.

Ore cars are hand-trammed through one branch of the tunnel to the surface where the ore is dumped into a surge bin feeding a sorting-belt conveyor. High-grade ore is sorted out and hand-cobbed on an adjacent platform to make shipping product. Mill-grade ore drops off the belt into a storage bin. A Diesel truck and trailer with a combined capacity of 14 tons haul the ore to the central milling plant at the Weigel mine six miles to the east.

Upper Level Development

Levels at about 100-foot intervals have been established to the fifth level. Crosscuts have been driven to the vein in which drifts (reef drives) 7 by 7 feet in cross section have been driven east and west to the limits of the ore. For advancing these drifts, a standard 20 to 24 hole drag round with a 4- to 6-foot cut is used. The rock and ore are relatively soft and all drilling is by jackhammers using tungsten carbide-tipped chisel bits. The machines are hand held except in raises and box holes where jacklegs are used.

After the ore limits have been reached, the drifts are silled out to the full width of the vein and the back shot down to give 13 feet clearance above the rails. Timber sets are placed on four-foot centers with chutes on 20-foot centers after the broken ore is mucked out. Shrinkage stoping starts above the sill set. Three-and-one-half-foot holes are drilled on four-foot centers across the vein and six along the strike. Blasting is done with fuse and 50 percent powder. Cribbed manways are carried on 100-foot centers. The stope is carried to a height of 80 feet leaving a 20-foot floor pillar below the level above. The mining cycle is loading and tramming on the first shift, drilling and blasting on the second, and lowering and distributing of supplies on the third.

Change To Footwall Drifts

After stoping had extended to the fifth level, it was found that it was difficult to keep the levels open as the timber sets were being crushed. Accordingly, all development below the fifth level has been modified. Instead of drifting in ore, a footwall drift is now driven parallel to the vein and 20 to 25 feet away from it. These drifts are extended to the limits of the ore as on the upper levels.

From the footwall haulage drift, crosscuts at 50-foot intervals are driven to the hanging wall of the vein, inclined finger raises or box holes on each side of the crosscut are raised east and west at an angle of about 55°. At a vertical height of 20 to 25 feet, the raises are interconnected and silled out. Shrinkage stoping is then started leaving ore pillars between the raises. Disadvantages of this method are the increased time required to start a stope, and lower extraction, about 60 percent of vein compared with 80. This may be partially overcome in the future by increasing the level interval. The biggest advantages are ease in keeping levels open and the elimination of expensive timbering.

Plans have been made to fill the stopes with waste from a surface stockpile. A winze has been sunk to the first level from the tunnel to serve as a fill pass.

The shaft is downcast. Brattice doors are installed in the crosscut on each level to direct upcast air from the shaft bottom through the stopes and raises driven in the pillars between each level. Two surface fans exhaust 67,000 cubic feet of air per minute assuring adequate ventilation. The mine is dry, making only enough water for drilling.

Banded Ironstone Mine

In recent months a smaller amount of antimony ore has been mined due to the rapid drops in antimony prices. Therefore, renewed interest has been given to increasing production of gold ore and the old workings in the Banded Ironstone mine have been reopened. The single-compartment rectangular shaft is 950 feet deep. From 100 to 120 tons of ore can be hoisted through it on a two-shift-per-day basis. Development of the levels to the limits of the ore is underway in preparation for shrinkage stoping. The gold occurs in arsenopyrite in a quartz vein; appreciable amounts of pyrite are also found in the ore.

Other Mines

Four other main shafts have been operated in the past. From west to east they are the Jack, Weigel, Free State, and Monarch. Antimony production from the Weigel has been important and it may be reopened. It is the deepest, 940 feet vertical and then inclined to a depth of 1,380 feet. Hoisting capacity is 300 tons per day on a two-shift basis.

Two Separate Mill Circuits

All milling is done in the central mill in what is termed the Weigel section (see included map) near the Weigel shaft. The mill incorporates two separate circuits; one for stibnite ore and the other for banded ironstone gold ores. The circuit can be switched from either one to the other type of ore in 48 hours. The crushing, sorting, cobbing, grinding, and classification sections are common for treating either type of ore.

The plant has a maximum capacity of 16,000 tons of stibnite ore per month. Records for a month's operation treating ore with an average of 11.6 percent antimony and 0.17 ounce gold per ton show that a recovery of 93 per cent of the antimony and 82 percent of the gold was achieved. The concentrate assayed 62.2 percent antimony and 0.51 ounce gold per ton.

Another method of figuring plant capacity when treating stibnite ore is based on the daily production of concentrate which is 100 to 120 tons. In practice, production is based on the selling price and volume of concentrate orders, and the grade of ore treated.

Crushing Plant

All ore, either antimony-gold or straight gold, is delivered to the central mill in accordance with market demands. Ore is transported from the various shafts to the 400-ton coarse ore bin by trucks. Ore is withdrawn from this bin, as needed and transported to the crushing plant in one-ton cars operating on a continuous rope haulage system. Cars dump into a surge hopper which feeds a conveyor belt to the primary grizzly and sorting section. Trucks can dump directly into surge hopper or on floor adjacent to it for blending to meet tonnage and grade requirements.

Most of the hand sorting and cobbing is now done at the mines so only a final sorting and grading is done in the mill.

Stibnite Circuit

Jigs and the first bank of flotation cells in the stibnite recovery section are used to remove talcy schist and arsenopyrite and to recover any associated gold in the ore. The jig concentrate is removed in batches from the hutches and retreated on shaking tables. The high-grade cut is sent to the roasting section and tailing recirculated to the head of the mill feed.

The talcy schist and arsenopyrite are removed first so as not to contaminate the stibnite concentrate. Arsenic is the major impurity in the stibnite concentrate so removal of all the arsenopyrite is important. Other impurities found in the ore are lead and nickel which are also penalized in the concentrate.

After arsenopyrite is floated off, a stibnite flotation concentrate is made; it is cleaned and recleaned, thickened, filtered, sun dried, stockpiled, and bagged for shipment. However, if an unusually high arsenopyrite ore is being treated, the final stibnite flotation concentrate is tabled twice to eliminate all possible arsenopyrite. The high-grade table concentrate joins the gold concentrate for roasting and the table tailing forms high-grade antimony concentrate.

Gold Recovery Only

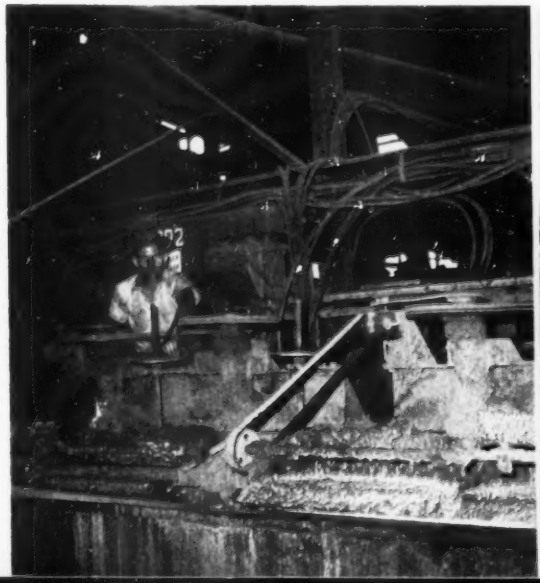
When treating straight gold ore, the mill has a capacity of about 9,000 tons per month. Overall recovery is about 80 percent. The circuit comprises gravity concentration, flotation, concentrate roasting, calcine grinding, and calcine cyanidation. Gold is recovered in jigs, on corduroy tables, and by flotation. The corduroy tables are placed in each of the mill circuits, including the calcine grinding section, and also at a point where the final tailing

To accelerate the drying out of the antimony concentrate, this rotary plow is used for mixing.

flows over them. The concentrates from the first corduroy tables are periodically treated on shaking tables on which a high grade concentrate is cut off and amalgamated. All the gravity concentrates are stored in a sump and periodically transferred to the roasting section.

When treating gold ore, only the first bank of flotation cells normally used for stibnite flotation form part of the gold circuit. The flow sheet shows the tailing from the antimony flotation cells going to the Brown tanks for cyanidation. This treatment was generally found to be unpayable and has been discontinued. The tanks are used in the new circuit for tonnage measurement only. At the present time the gold flotation concentrate and the primary jig concentrate are roasted, and calcine reground in a ball mill. The ball mill discharge passes over corduroy

LEFT: High-grade antimony concentrate is produced by flotation. RIGHT: The mill with the crushing plant at right.



A 26-man native labor gang spreading antimony flotation concentrate for sun drying. The white area in center is the tailing pond.

tables where a high-grade concentrate is recovered for direct amalgamation. The pulp forms cyanide plant feed.

Flotation Facts

In the gold flotation circuit, hydrated copper sulphate ($CuSO_4 \cdot 5H_2O$) is used as an activating and conditioning reagent. It is also used as a stibnite depressant. It is added to the flotation feed at the rate of 0.1 pound per ton of ore treated. Other reagents are Bear Brand xanthate, 301 at rate of 0.05 pound per ton; and pine oil, 0.01. The pH is maintained at about 8.0 and the liquid-to-solid ratio at five to one. Pulp density is controlled at the primary classifier where crushing plant wash water and jig water are used for dilution.

Cyanidation

Only the roaster calcine is now being cyanided in three Crosse tanks. Pulp is treated in batches with a liquid-to-solid ration of one to four. Preliminary agitation is done by compressed air with lead nitrate used for precipitating the dissolved sulphides. Cyanide is then added to the pulp to make a 0.3 percent KCN strength. Agitation is then continued. Air is shut off and lime is added to accelerate settlement. Barren cyanide solution is pumped into the inner tank, the clear solution is decanted off while the settled slime is filtered on a Paxman filter. The filter cake is returned to another Crosse tank for retreatment after which the residue is filtered and washed to the slime dam.

The clear solution (pregnant) from the tanks and the filtrate from the Paxman filter are clarified in sand filter tanks from which the solution flows to zinc precipitation boxes.

Reagent consumption in the cyanide section per ton of ore milled is: lead nitrate (Crosse tanks), 0.015 pound; sodium cyanide, 0.22 pounds; lime, 0.10; zinc shavings, 0.11. Flux used in refining gold precipitate is 20 percent borax, 20 fluorspar, 35 silica, and 2½ fine iron.

Water and Power Supplies

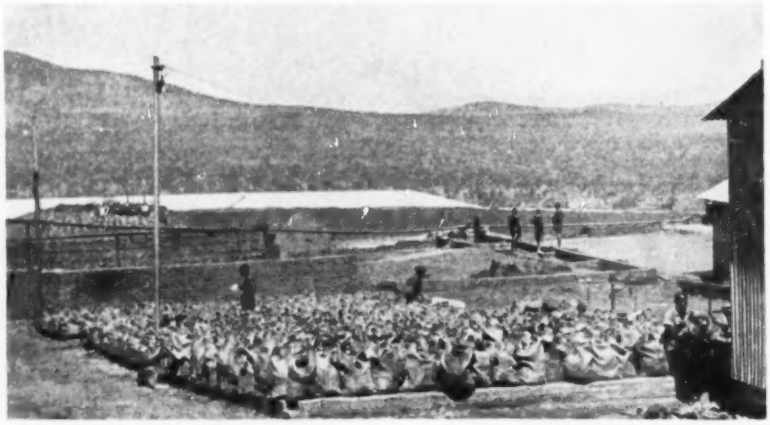
One of the most acute operating problems is to secure an adequate and consistent water supply. Operations are entirely dependent on variable sources in the vicinity of the mine. The principal source is the Letaba River where a pumping plant is operated 14 miles from the concentrating mill. Two Diesel-driven pumps each having a capacity of 10,000 gallons of water per hour are used. Pumps are 8- and 10-stage centrifugal. About 84,000 gallons of water per day are accumulated and pumped from the Weigel, Banded Ironstone, and Old Free State mines.

Total monthly power requirement is about 420,000 kilowatt hours. This is generated at two plants at the Weigel section and distributed by company power lines to the outlying mines. The Weigel shaft has its own power plant with a 125-kw generator powered by a steam engine. Four hand-fired coal burning boilers furnish steam. The main plant has three Diesel electric generators of 128-, 300-, and 1,000-kw capacity and three 250-kw, 50-cycle, 2,200-volt generators driven by three 265-hp gas engines. Gas is produced from bituminous coal in three gas producers.

Recent Operations

The decline in the world price for antimony starting early in 1952 forced the company to operate at a reduced rate during the remainder of the year with exploration limited to locating extensions of known ore bodies. Of the total development footage—3,191—in the first nine months of the year, only 120 feet was driven in the third quarter. From a milling rate of 12,000 tons per month early in the year, production was reduced to about 7,000 tons in the third quarter.

The dried concentrate (65 percent antimony, 5 percent H_2O) is sacked and stored for shipment.



HOUSE SMALL BUSINESS COMMITTEE HEARS WESTERN MINE OPERATORS

The House of Representatives, Select Committee on Small Business of the 83rd Congress held an all-important series of mine hearings in the western part of the United States in late April. The hearings were important because they were the first mining hearings to be held by a congressional committee for a number of years and more importantly, they were the first held by the Eisenhower administration.

The committee is a fact-finding one which gathers pertinent information for a report which is presented to legislative committees of the House for their attention and action to perpetuate the small businesses of the nation. Small business has been defined as one with less than 500 employees. Mining, therefore, is a key example.

After hearing the testimony of hundreds of witnesses and accepting many written statements in Denver, Colorado; San Francisco, California; Spokane, Washington; and Phoenix, Arizona, the committee returned to Washington to write the report. In all hearings committee chairman Hill and acting chairman Riehlman asked that any miner who was unable to testify send his written testimony to the committee at Suite 129, House Office Building, Washington 25, D. C. so that it might be included in the official records.

Highlights of the four hearings and photographs of the committee in action follow.

In DENVER — Uranium, Fluorspar, Lead, Zinc

"Is it wise to place the safety and security of our nation on the possibility of acquiring minerals from abroad?" This was the theme of the testimony before the House Select Committee on Small Business at its two-day mining hearings in Denver. The question propounded by Robert S. Palmer, executive vice president of the Colorado Mining Association, was emphatically and positively answered—no—by scores of mine operators from Colorado, New Mexico, Arizona, Utah, and Illinois.

Miles P. Romney, manager, Utah Mining Association, warned the congressmen that letting the mining industry die, as it is now doing, is "a sudden invitation to disaster in case of war."

Charles A. Chase, executive vice president of the Shenandoah Dives Mining Company, Silverton, Colorado, outlined the economic crisis that comes to a mining camp when mines and custom mills close. The recent forced closing of the Shenandoah's custom milling unit deprived the district's small miners of a local market for ores forcing them to also close.

In a carefully prepared analysis of metal sales income and operational costs, Henry P. Ehrlinger, president, Lead Carbonate Mines, Inc., Silverton, Colorado, proved that the smaller miner receives only 28.9 per cent of the gross value of his gold-silver-lead-zinc-copper ore. After milling, smelting, transportation, and marketing charges had been paid by the miner, his net return was only $13.53 per ounce for gold, $0.43 per ounce for silver, $0.054 per pound for lead, $0.0727 per pound for copper, and $0.0169 per pound for zinc. The respective market quotations for the metals at the time ore was shipped were $35.00 for gold, $0.90 for silver, $0.148 for lead, $0.245 for copper, and $0.136 for zinc. Ore grade was 0.074 ounce gold, 5.27 ounces silver, 4.23 percent lead, 0.65 percent copper, and 5.27 percent zinc per ton.

Testimony of southern Illinois fluorspar producers was given at the Denver hearing. In a statement prepared for the Minerva Oil Company, Hardin County, Illinois, Berkeley Jones, secretary, reported that Minerva shipped 18,000 tons of ceramic-grade fluorspar concentrate in 1952 and that the ore, as mined, had a fluorspar-to-zinc ratio of five-to-one. Normally, income from the zinc would be equivalent to that from fluorspar, but under today's depressed zinc price the loss of zinc income makes operations very difficult. He warned that if fluorspar imports from Mexico continue at high present rate, Minerva will be forced to close. He added that under the present tariff the duty on 97 percent CaF_2 concentrate is only $1.875 per ton and, with $7.50 duty on 95 percent grade, the higher grade was being imported, then blended down for marketing to escape the higher duty. He called for a $7.50 duty regardless of grade. The only alternative was to close down domestic mines.

A. H. Stacy, partner, Victory Fluorspar Mining Company, Rosiclaire, Illinois, outlined in his statement the fact that if domestic miners must compete with foreign the Victory mine would be the bitter fruit of such a policy. Competition with low-cost foreigners is "unreal, unnatural, and unfair to our own people . . . a very vital industry shall soon fall by the wayside," Stacy reported.

In SAN FRANCISCO — Antimony, Chromite, Tungsten

Strategic metals and minerals dominated the San Francisco, California hearings of the House Select Committee on Small Business. Mine operators from California, Oregon, Nevada, and Idaho gave their views and recommendations at the all-day session. The meeting was arranged by the Mining Committee of the San Francisco Chamber of Commerce in cooperation with the Portland, Oregon, Chamber of Commerce, Oregon Mining Association, Nevada Mining Association, Mother Lode Mining Association, and the Western Mining Council.

In a clear-cut analysis of the United States and world status of antimony, James P. Bradley, vice president of the Bradley Mining Company, San Francisco, California, told the committee that "The United States is in the dangerous position of being dependent upon far off and uncertain sources for the greater part of its primary antimony imports at a time when our national stockpile has been built up to only a six month's supply." The reason for this dependency is not the lack of antimony deposits in the United States, but rather that the "development of domestic antimony mining has been held back by unstable market conditions and by the almost complete lack of tariff protection," he said. His recommendation to overcome this dangerous situation was to reevaluate the antimony stockpile and maintain some domestic production capacity.

Charles H. Segerstrom, Jr., president of the Nevada-Massachusetts Company, Tungsten, Nevada, summarized the tungsten industry and told of the effectiveness of the government's Domestic Tungsten Program which assures a market until July 1, 1956 at $63.00 a short ton unit. As for the future he recommended that the Domestic Tungsten Program should be extended two years beyond its expiration date, that producers should have a written contract with government rather than present "postcard contract," that the existing low tariff on tungsten be continued, that the government inaugurate a more vigourous domestic mining policy, and that depletion tax allowances be continued.

The Problems Of Domestic Chrome Ore Production was the subject of the testimony of Fay I. Bristol, president, Oregon Mining Association, Grants Pass, Oregon. He traced the domestic chrome mining industry's history and outlined the work done by the association in formulating a domestic program and establishing a government stockpiling depot at Grant Pass, Oregon, following the start of the Korean War. He said the program had been a success with 110 domestic chrome producers in 1952 and 15 new ones in 1953. This year's shipments are three times greater than for same 1952 period. As for the future, he strongly recommended that the government accept carload lot deliveries f.o.b. railhead instead of wasting money and railroad facilities in shipping California ore to Grants Pass then reshipping it back over the same railroad. He also asked that the chrome purchase program be extended indefinitely, that a top limit of production per property be established, and that the price for chrome ore after June 30, 1955 be close to that now paid.

A sensible national policy on mercury was suggested by C. N. Schuette, Sebastopol, California, consulting mining engineer and long-time mercury authority. He called for retention of a tariff with the rate increased to the ad valorum level of the early 1920's or put on a sliding scale. He emphasized that the purchase policies of the Munitions Board should not permit tearing down of a domestic industry, but should be such as to attempt to build it up. That a sensible tax program is needed to bring out more venture capital for exploration and development; and that honest Department of Justice anti-dumping law enforcement is essential.

Hewitt S. West, president, Managanese, Inc., Henderson, Nevada, made the following recommendations which, in his opinion, would more than double domestic production of low-grade manganese, and increase metallurgical-grade production by 50 percent if put into effect. He recommended that the present government manganese programs be extended for at least three years, that the size of the purchase depot programs be doubled, and that the cut-off grade of 15 percent be revised downward where feasible to 13 percent in cases where ore was easily upgraded. The Domestic Manganese program was started in July 1951; the small lot depot purchase program is limited to 6,000,000 units.

Pictured at the San Francisco hearing on April 25th from left are: Leslie Grooms, Mother Lode Mining Association, Jamestown, California; Roy Hardy, president Nevada Mining Association, Reno, Nevada; Robert S. Palmer, executive vice president Colorado Mining Association, Denver, Colorado; Philip R. Bradley, Pacific Mining Company, San Francisco, California; Congressman R. W. Riehlman (New York); Hewitt West, Manganese Inc., Henderson, Nevada; Congressman W. M. McCulloch (Ohio); A. L. Bartell, Portland Chamber of Commerce, Portland, Oregon; and Congressman Craig Hosmer (California).

In SPOKANE — Lead, Zinc, Gold, Taxation

The Congressional fact-finding committee in Spokane on April 27 got an earful regarding what government policies are doing to the domestic metal mining industry.

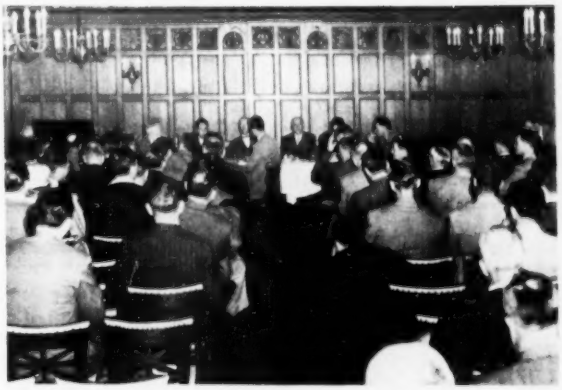
A score of witnesses, mostly mine operators, union spokesmen and business men from northern Idaho's Coeur d'Alene mining region, told of production curtailments, mine closings, unemployment, miner exodus and economic recession.

Testimony showed that small mine operators are being forced out of business by zinc-lead price declines and taxation policies which do not enable them to accumulate adequate working capital for a rainy day.

Survival, not profit, is the immediate objective of mining firms still operating, said Frank N. Marr, of Spokane, Washington, president of Northwest Mining Association. He testified that Spokane-Idaho Mining Company, which he heads, like many another small mining firm is losing money and in debt. Although the firm's Constitution mine yielded nearly $12,000,000 worth of zinc and lead since 1941, it probably doesn't rate as a mine at current prices of the metals, he said. Many other marginal base metal producers are "in the same boat," he added. The mining industry cannot compete with segments of the national economy subsidized by the government and with foreign mines financed by taxes levied in part on "our own sick little business," he declared.

Henry L. Day, Wallace, Idaho, president of the Idaho Mining Association, testified that employment in the Coeur d'Alenes has dropped by 600 men in six months due to falling lead-zinc prices.

Witnesses agreed that excessive imports were to blame for the plight of the domestic lead-zinc industry. An impressive array of supporting statistics was presented by C. E. Schwab, Kellogg, Idaho, manager of industrial relations for Bunker Hill & Sullivan Mining and Concentrating Company, testifying at the request of a majority of the Pacific northwest's lead-zinc mine operators.



More than 100 mining men from Washington, Idaho, and Montana attended the Spokane hearing. Shown here is part of the crowd listening to Henry L. Day testify.

He testified that since June, 1950, total loans and grants amounting to $245,000,000 have been made available through federal agencies and the Export-Import bank to expand foreign mineral output. He said it is "rubbing it in" when employees and the companies for which they work are taxed to put themselves out of jobs and out of business.

Quoting foreign wage scales, he told the committee that a large proportion of the world's lead and zinc is produced by employees who receive wages that would be "absolutely unthinkable" in the United States.

He charged that promoters of the "trade, not aid" theory are engaged in manufacturing or assembling many products rather than extracting raw materials. The Simpson bill (H. R. 4294), he contended, goes directly to the solution of the unprecedented lead-zinc imports.

A majority of witnesses advocated passage of the Simpson bill which would provide a sliding scale import tax on lead and zinc. Day pointed out that further government stockpiling could be done with little, if any, additional legislation and acquisitions at present prices would average-down stockpiling costs. Spokesmen for the Mine, Mill and Smelter Workers' Union favored a premium price plan sponsored by Senator James Murray of Montana.

Malcolm C. Brown, general superintendent, Sidney Mining Company, Kellogg, Idaho, pointed out that the government paradoxically is assisting in the search for ore bodies while fostering foreign imports which make it impossible to mine the ore at a profit if it is found.

L. J. Randall, president, Hecla Mining Company, Wallace, Idaho urged removal of limitations on deduction of exploration expenditures and of percentage depletion in computing net operating loss carry-back and carry-over, a tax-free period for new mines like that in Canada, and a tax-free depletion allowance to stockholders.

Carl J. Trauerman, secretary-treasurer, Mining Association of Montana, Butte, Montana, urged a congressional study of the "appalling" gold mining situation and reviving of gold mining on a businesslike basis.

Principal industry witnesses at Spokane, Washington, congressional hearing into mining industry problems (left to right): Frank N. Marr, president of Northwest Mining Association and Spokane-Idaho Mining Company; Henry L. Day, Wallace, Idaho, president of Idaho Mining Association and Day Mines, Inc.; L. J. Randall, Wallace, Idaho, president of Hecla and Polaris mining companies, and Charles E. Schwab, Kellogg, Idaho, manager of industrial relations for Bunker Hill & Sullivan Mining and Concentrating Company.

In PHOENIX — Asbestos, Manganese, Copper

The fourth and last hearing by the House Select Committee on Small Business problems—and their suggested solutions—now plaguing the small mine operator was held in Phoenix, Arizona. Among those present to testify orally and by written report were representatives of mining companies, and civic, operator, and union organizations from Arizona, New Mexico, Southern California, Utah, and the Oklahoma-Kansas-Missouri Tri-State mining district.

All of the reports centered around problems that have arisen from unbalanced relationships between foreign and domestic metal prices, tax programs that have destroyed the availability of speculative money, and government loans for exploration and production. Of the many solutions suggested during the hearings, the Simpson Bill (H. R. 4294) received the bulk of comment. Nearly unanimous agreement was evident in the support of this means as an equalizer to give the domestic producer a competitive position against low-cost foreign metal imports. Strong testimony was introduced, however, that indicated more favorable tax and depletion allowances together with government stockpiles of domestic metals, would give the needed support to maintain a strong and vigorous industry.

All factions of the mining industry were represented among the spectators and in the testimony given. Labor, civic, and industry leaders were in complete agreement that immediate government action was necessary to insure a secure future for mining. During the morning sessions, representatives of labor groups stressed the importance of immediate government assistance to mining to relieve the pressure of unemployment from presently inactive mining communities. Among those testifying was Frank Robles, member of the Arizona state legislature, who, when acting committee chairman Hosmer suggested such problems are local and best handled on a local level, stressed the desire on the part of labor for more jobs and not unemployment insurance.

Problems met in the production of Arizona's crysotile asbestos by small producers near Globe, Arizona were brought out by D. E. Green, co-owner of the Bear Canyon Mining Company.

In the final morning testimony, Ray Dye, co-owner of the Copper World mine and the Boriana Tungsten mine, and J. H. Cazier, operator of the Copper King mine and the Black Pearl (tungsten) mine, agreed that the industry needed the protection of tariffs on foreign imports, government stockpiles of domestic minerals, and tax relief—in the form of tax-free years when production begins and a greater spread of profits (carry-back and carry-forward) over nonproductive years—and increased depletion allowances.

As the afternoon sessions opened, Charles H. Suiter, a mine owner representing the Tombstone council of the ASMOA, Robert E. Paulsen, executive secretary of the Prescott, Arizona Chamber of Commerce, and Grover J. Duff, manager of Arizona operations of the Eagle-Picher Mining Company emphasized the need by the small mine operator for a guaranteed f.o.b. mine price rather than a guaranteed gross metal price. George A. Warner, manager of the Shattuck Denn Mining Company, Fluorspar Branch at Albuquerque, New Mexico, explained the problems connected with mining and processing fluorspar under present conditions.

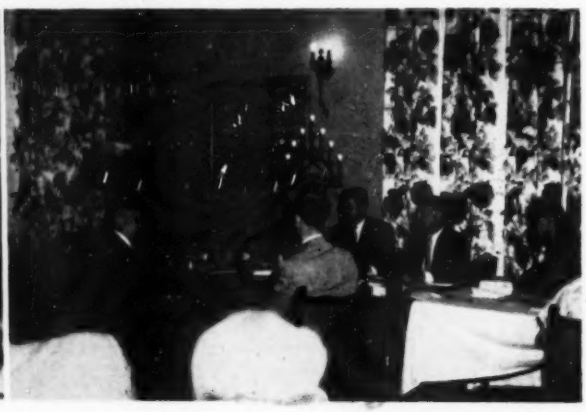
Tom Kiser, owner of the Wesah Mining Company at Treece, Kansas, told of the drastic effects that present lead and zinc prices have had on over 100 small operators in the Tri-State district.

Paul Hunt, general manager of the Park Utah Consolidated Mining Company, Park City, Utah, expressed his concern over the situation at Park City where but 30 percent of the mine labor force available are now employed.

Al Stoval, manganese shipper to the government's Wenden, Arizona purchasing depot, said there was little concern among manganese producers over foreign activities, but stressed the importance of a strong domestic program and freer purchasing bases—both in amount and grade of ore. He further requested a three-year extension of the present program, to expire in 1956.

In the brief time remaining at the end of the hearings, Charles Willis summed up many of the pertinent problems that face present small mine operations. In stressing the need for a strong domestic mining program, not only as a local industry but as an important factor in defense plans, he said of the need for tariffs such as proposed in the Simpson bill, ". . . tariffs. Not protective, but tariffs for the equalization of competitive opportunity between foreign and domestic producers."

LEFT: The large crowd at the Phoenix, Arizona hearing pays strict attention to the testimony of Robert E. Paulsen, executive secretary, Prescott, Arizona Chamber of Commerce. RIGHT: Charles F. Willis, Secretary of the Arizona Small Mine Operators Association (at left), presents his testimony. Willis arranged for and organized the Phoenix hearing.



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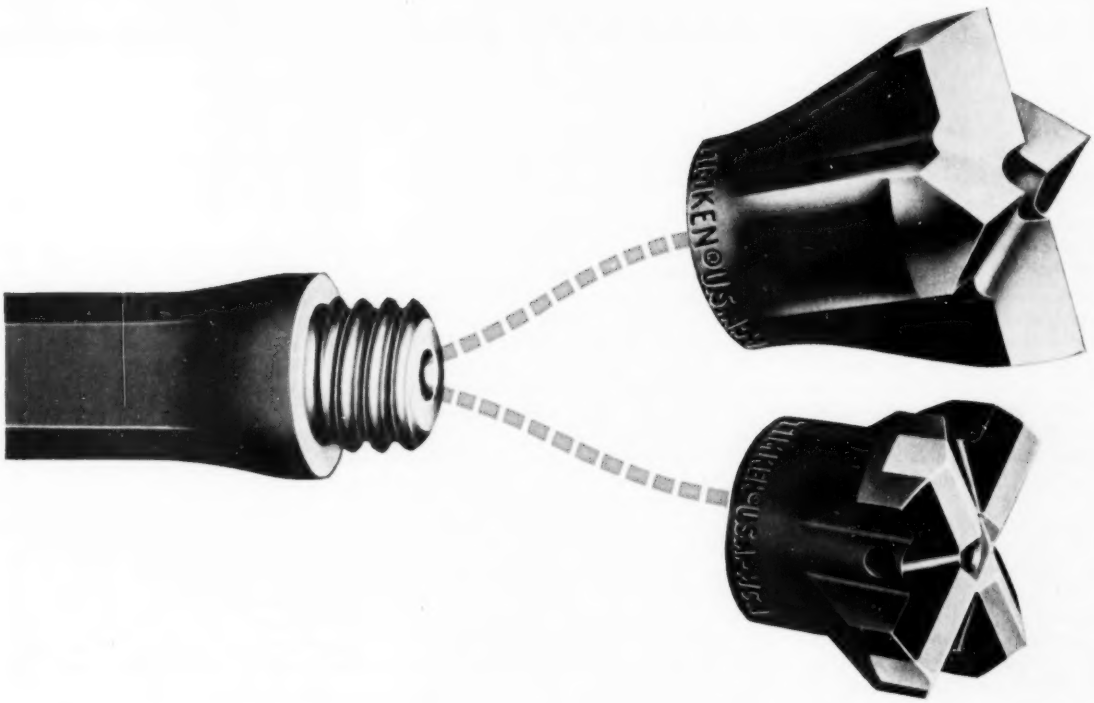

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John D. Mitchell Tells of

LOST MINES AND BURIED TREASURES

THE OLD PAPAGO'S MINE

Not many years ago a Papago Indian, full of years and firewater, passed on to the happy hunting grounds leaving to his grandson a gold ledge for which the youth has been hunting ever since.

The old man lived in the little village of Moivavi (Many Wells), on the northern edge of the Santa Rosa country east of the mining town of Ajo, Arizona. Many of the Indians now residing in that country knew the old man and saw the ore he had mined. When in need of money to buy food for himself and his squaw, the old fellow would leave camp early in the morning and always return before dark, bringing with him a small sack of high-grade gold ore. This he gave to his squaw to grind in a metate to free the gold from the quartz. The resulting rough gold was sold in Ajo, Gila Bend, or Casa Grande.

Over a period of many years the old Papago had dug out the small sacks of gold ore when in need of food and drink, and had kept his secret from Indian and white man alike. When too old and feeble to travel any more he told his grandson about the rich ledge and how to find the entrance which he always kept covered with a large flat rock.

When a great drought came upon the Indian country and food was scarce, the young Indian set out to find the vein that his grandfather had told him about. Many trips were made to the mountain where the mine was said to be located, but no trace of it could be found. The flat rock must have been covered with earth.

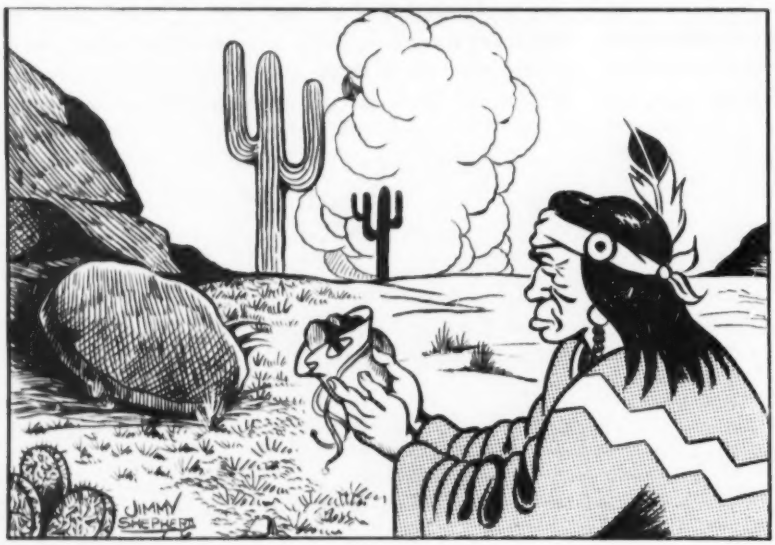
The trail from Ajo to Moivavi leads across the Ajo valley, and then up over the old Indian trail to some large tanks of water near the summit of the first range of mountains. The tanks, formed by nature in the solid rock, have for centuries been the watering place of the quail, doves, and wild animals that live in the surrounding hills. From there the trail passes up over the summit and down into a beautiful little valley covered with tall grass. In the center of this valley stands a table-top mountain where thousands of Papagos lie buried in the loose rock around its base.

As the writer, accompanied by the young Indian and an old man, jogged along over the winding trail, the north wind was whistling over the crags with a moaning sound. The Indians seemed ill at ease and anxious to leave this mountain of the dead far behind.

We reached the village of Moivavi late in the evening and passed the night in a brush shack with a bunch of mongrel dogs and Indians snoring around a small fire built in the center of the room. Two days of searching in the vicinity failed to disclose the location of the ledge, but a large piece of float picked up in the arroyo on the west side of the mountain weighed 35 pounds and contained, when broken up, $1,200 worth of gold.

The young Papago insists, and perhaps correctly, that his grandfather's mine is located in that small iron-stained mountain near the village of Many Wells.

The old fellow would leave camp early in the morning and always return before dark bringing with him a small sack of high-grade gold ore.



New Recovery Process Developed For Taconites

A new process has been perfected by the Battelle Memorial Institute in Columbus, Ohio to recover magnetic iron from low-grade taconite ores. The process, known as "reduction-oxidation process for the treatment of nonmagnetic taconites," is designed for use on Lake Superior ore reserves which vary from 25 to 35 percent in iron content and which contain sizeable percentages of difficult-to-recover nonmagnetic iron.

A 600-pound-per-hour pilot plant has been fueled with gaseous hydrogen and or carbon monoxide mixtures which have made it possible to cut down the amount of initial heat required to convert the ore, and to recover and reuse that heat, as well as to increase the grindability of the ore. The process is applicable tc a wide variety of taconites including those containing hematite, magnetite, and siderite.

Companies sponsoring this and other long-term concentrating studies are: Armco Steel Corporation, Cleveland-Cliffs Iron Company, M. A. Hanna Company, Inland Steel Company, Jones and Laughlin Steel Corporation, Oglebay, Norton and Company, Oliver Iron Mining Division of U. S. Steel Corporation, Pickands Mather and Company, Republic Steel Corporation, and Snyder Mining Company.

ACTIVITIES OF U. S. MINING MEN

DR. WILLIAM E. WRATHER, director of the United States Geologic Survey since 1943, will remain in office, according to a recent announcement by Secretary of the Interior Douglas McKay. Dr. Wrather had filed a letter of resignation when Secretary McKay first took office in order to give him a free rein in making new appointments, but the latter refused to accept the resignation, adding, "I have been impressed with your professional background and with your sincere effort to cooperate with me . . . in any important undertaking . . . one needs to have key positions filled with loyal and competent persons."

Max Lauderback has joined the staff of Kaiser Steel Corporation as metallurgical superintendent after spending six years as assistant metallurgical engineer for the Chicago and Pittsburgh divisions of the Carnegie Illinois Steel Corporation. Another Kaiser staff member, **Edward J. Duffy**, has retired as manager of raw materials at the Kaiser Steel plant. Mr. Duffy had been with Kaiser Steel since 1942 and, like Mr. Lauderback, previously was employed by Carnegie Illinois.

Lewis W. Douglas, former ambassador to Great Britain, has been named chairman of a conference to be held in Washington, D. C. next fall to evaluate the United States' midcentury position with respect to present and future use of natural resources. Mr. Douglas, a native of Arizona, has been affiliated with Phelps Dodge Copper Corporation and was vice president of American Cyanamid Company for several years. Conference vice chairmen will include **Herman W. Steinkraus**, president of Bridgeport Brass Company; **Dr. Lewis Webster Jones**, president of Rutgers University and former member of the President's Water Resources Policy Commission; and **Dr. Karl T. Compton**, chairman of the Corporation of the Massachusetts Institute of Technology. The conference is being sponsored by Resources for the Future, which identifies itself as a non-profit corporation organized to support research and education in the field of resources.

E. EMMONS COLEMAN has been designated plant manager of the M. A. Hanna smelter company in Riddle, Oregon. Construction has already started on the plant, which will produce ferronickel from the huge deposit which Hanna has discovered. Mr. Coleman was general manager of the Bradley Mining Company electric furnace plant at Stibnite, Idaho prior to accepting this new job.

Judson C. Travis has been elected president of Handy & Harmon, refiners and fabricators of precious metals and one of the world's largest dealers in silver. Mr. Travis, previously vice president and general manager, succeeds **G. H. Niemeyer.** Mr. Niemeyer is retiring after 15 years in the presidency, but he will continue to act as chairman of the executive committee, a director, and president of Handy & Harmon of Canada, Ltd., a wholly-owned subsidiary.

Marshall L. Havey, assistant to the president of The New Jersey Zinc Company, has been elected president of the American Zinc Institute. He succeeds **Russel B. Caples**, who has held the office since 1951. New vice presidents include **Warren H. Leverett**, National Zinc Company; **George W. Potter**, Potter-Sims Mines, Inc.; and **Frank A. Wardlaw, Jr.**, International Smelting & Refining Company. **Earle V. Daveler**, American Zinc, Lead and Smelting Company, was reelected treasurer, and **Ernest V. Gent** continues as executive vice president and secretary. The following directors were also elected: **K. C. Brownell**, American Smelting & Refining Company; **E. R. Dondorf**, National Lead Company; **R. E. Dwyer**, Anaconda Copper Mining Company; **Andrew Fletcher**, St. Joseph Lead Company; **Elmer Isern**, Eagle-Picher Company; **G. H. LeFevre**, U. S. Smelting, Refining & Mining Company; **W. H. Leverett**, National Zinc Company; **E. H. Snyder**, Combined Metals Reduction Company; **S. D. Strauss**, American Smelting & Refining Company; and **Jean Vuillequez**, The American Metal Company.

Howard I. Young submitted his resignation as deputy administrator of the Defense Materials Procurement Agency last month, and is preparing to return to his position as president of American Zinc, Lead and Smelting Company. Mr. Young has been acting DMPA administrator since the resignation of **Jess Larson** some months ago.

Roger I. C. Manning, director of the Arizona Department of Mineral Resources, represented Arizona at the 11-state Governors' Delegates session held in Salt Lake City, Utah last month. The group's purpose is the maintenance of liason with the congressional delegations of each of the 11 western states in order to present a "united front" on proposed federal legislation.

John E. Kelly, a vice president of Kerr & Company, Engineers, will direct the extension of the firm's examination, appraisal and development services to the African continent. Mr. Kelly has offices in Washington, D. C.

Arthur N. Nelson, general superintendent of Federal Mining and Smelting Company's Morning mine at Mullan, Idaho has been named assistant general manager of Cuba's largest copper mine, Minas de Mathambre. Mr. Nelson had been with Federal since 1935.

J. B. HAFFNER, vice president and general manager of The Bunker Hill & Sullivan Mining and Concentrating Company of Kellogg, Idaho, was recently elected president of The Lead Industries Association. He succeeds **FELIX WORMSER**, vice president of St. Joseph Lead Company, who has been appointed Assistant Secretary of the Interior for Mineral Resources. Other new officers include vice presidents, **K. C. BROWNELL**, **J. A. MARTINO**, and **J. M. BOWLBY**; secretary-treasurer, **R. L. ZIEGFELD**.

Ellis Fielding is new superintendent of Isbell Construction Company's Leviathan open pit operations near Markleeville, California. Mr. Fielding, former superintendent of Isbell mining activities at Kennecott Copper Corporation's Chino mine in New Mexico, will handle the supervisory duties of **Frank Zielinski**, who is taking a leave of absence for medical treatment. The Leviathan mine is being developed to supply sulphur ore for the Yerington, Nevada plant of Anaconda Copper Company.

Carl Tolman has been appointed vice chancellor and dean of faculties at the University of Washington, but will continue to act as dean of the graduate school and professor and chairman of the department of geology. He has been chief of the quartz-crystal-abrasives section, Mineral Division, Foreign Economic Administration, and also served as a consulting mining geologist for the U. S. Geological Survey, Geological Survey of Canada and other private and public agencies.

Lewis M. Robinson has been promoted from superintendent of the Triumph mine in Blaine County, Idaho to general manager. He succeeds **A. H. Shoemaker**, who resigned to become general manager of the Homestake gold mine in Lead, South Dakota.

Alexander C. Brown, president of the Cleveland-Cliffs Iron Company, has been elected chairman of the

A. H. SHOEMAKER has been appointed general manager of the Homestake mine in Lead, South Dakota, succeeding the retired **GUY M. BJORGE** (See *Mining World*, May, 1953). Mr. Shoemaker, also a Homestake vice president, leaves the San Francisco main office to assume the direction of the largest single gold mining operation in the western hemisphere.

board, succeeding **Edward B. Greene.** Mr. Brown will continue as president of the company and chief executive officer. **Edmond Earl Lincoln** was the only new director elected.

B. M. Andreas is new assistant general manager of Minnesota operations for M. A. Hanna Company. He succeeds **E. S. Mollard,** who has been promoted to general manager of Hanna mining and smelting operations in Oregon. **R. C. Wallace,** who had been superintendent of the Cooley district, moves into Mr. Andreas' former position of superintendent of the Hibbing district.

New officers were elected by the Tri-State Zinc and Lead Ore Producers Association in Baxter Springs, Kansas. **O. W. Bilharz,** president since 1945, submitted his resignation, and will be succeeded by **Harold Childress.** Other officers are **Elmer Isern,** first vice president; **H. G. Wilman,** second vice president; and **Ward Ball,** treasurer.

C. DeWitt Smith, superintendent of mines for St. Joseph Lead Company in Gouverneur, New York since 1950, has been advanced to a new position in the company's New York office. **Maynard Hurley,** mine captain at the Edwards mine, moves into the vacated post, and **C. William Hawn,** formerly located at St. Joe operations in Argentina and Canada, is new mine captain.

G. Don Emigh has been appointed director of mining for Monsanto Chemical Company's phosphate division with offices at St. Louis. Mr. Emigh had been production superintendent of Monsanto's operations at Soda Springs, Idaho.

R. B. Fuller, present manager of the Florida phosphate department of International Minerals and Chemical Corporation, will be promoted to the position of assistant to the vice president in charge of the phosphate division on July 1. **F. B. Bowen,** present manager of the Tennessee phosphate department, will move into the spot left vacant by Mr. Fuller. Mr. Bowen will be succeeded by **C. Lester Richards,** present assistant manager of the Tennessee department.

Phil Shenon, consulting geologist in Salt Lake City, Utah, has been named

HENRY MULRYAN (right), past director of the Los Angeles Chamber of Commerce and ex-chairman of the organization's mining committee, is honored by fellow committee members for six years of service to the mining industry and the community. A plaque expressing appreciation is presented by PETER COLFAX, mining committee chairman, as E. O. SLATER, past chairman of the group, looks on. Mr. Mulryan is executive vice president and general manager of the Sierra Talc and Clay Company; Mr. Colfax is president of the American Potash and Chemical Corporation; and Mr. Slater is president of Smith-Emery Company.

to the board of directors of Day Mines, Inc. in Wallace, Idaho. He replaces **Paul B. Jessup,** who resigned recently to join Kennecott Copper Corporation in New York.

James E. Castle recently joined Foote Mineral Company as manager of the lithium mining and milling division at Kings Mountain, North Carolina. He formerly was assistant plant manager of the Balmat mill of St. Joseph Lead Company. **Ernest A. Remesch** is new superintendent of Foote's recently completed lithium processing plant at Sunbright, Virginia. He had been plant engineer and plant manager for Melson Fertilizer Company in Georgetown, Delaware.

Josiah Work is now manager of the Pocatello, Idaho elemental phosphorus plant of the Westvaco Chemical Division, Food Machinery and Chemical Corporation. Mr. Work has been with Westvaco since 1950.

New superintendent of the timber lands for the Oliver Iron Mining Division, U. S. Steel Corporation, is **Maurice C. Schaller.** Mr. Schaller is a forestry graduate and has been affiliated with the U. S. Forest Service for the past eight years. Another Oliver employee, **Alfred F. Savage,** has been advanced to the position of assistant superintendent of the Walker-King iron mine. He was a pit foreman at Oliver's Arcturus mine.

The Mineralogical Society of Utah has elected the following officers: **Golden W. Robbins,** president; **J. J. Hays,** first vice president; **Kenneth Tanner,** second vice president; **Stewart Romney,** secretary; and **Mary Moorehead,** treasurer.

John F. Cowan will head the fourth crew set up under the new working schedule at International Minerals and Chemicals Corporation's Florida refinery. The new shift foreman has been with the company since 1939, and worked for Phelps-Dodge Corporation prior to that time.

The following men have been appointed to the Wyoming Natural Resources Board: **Manville Kendrick,** Sheridan; **Lloyd Haygood,** Casper; **Leonard Thornton,** Thermopolis; **Charles Astler,** Cheyenne; and **Glen Sorenson,** Kemmerer.

Professor Clark B. Carpenter, head of the metallurgy department and dean of the graduate school, will retire this summer from the Colorado School of Mines faculty. No successor has been announced. Professor Carpenter has been a member of the Mines faculty since 1920 and at one time was affiliated with Anaconda Copper Mining Company and Colorado Fuel and Iron Corporation.

Robert Carter and **Cecil Clark** are two new drillers at the Grants drilling project of E. J. Longyear & Company at Cubero, New Mexico.

Metallurgist **James W. Cole** has left the recently closed Shenandoah-Dives Mining Company to accept a position with Vanadium Corporation of America at Durango, Colorado. He heads a crew of six men who will check samples of incoming ore shipments.

Dr. J. Keith Rigby has issued a new publication through the Utah Geological and Mineralogical Society dealing with the geology of the Selma Hills in Utah County, an area regarded as an extension of the Tintic district.

Charles Will Wright

CORRECTION

Charles Will Wright and John Beaupre Dorsh co-authored, as usual, the annual section "An Accounting of World Mining For 1952" for the Mining World Yearbook published on April 15th. Through a printing error, their respective pictures were transposed. Herewith are the authors' pictures as they really are.

John Beaupre Dorsh

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Field reports indicate that "Wear-Sharp" repointers will give as high as six times the life of other teeth.

In these photographs at right of a typical case history, old repointers lasted from three to four days. Amsco "Wear-Sharp" repointers lasted 32 days—eight times the service life of the repointers previously used.

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ACTIVITIES OF INTERNATIONAL MINING MEN

PHILIP D. PEARSON has been appointed manager of Caland Ore Company, Inland Steel Company's Canadian subsidiary. Mr. Pearson who was superintendent of Inland's Menominee Range operations at Iron River, Michigan prior to his promotion, started with the company in 1936. He has been an engineer at the Morris and Greenwood mines in Ishpeming and superintendent of the Sherwood and Greenwood mines. He was made superintendent of Menominee Range in 1948. The appointment of E. W. WHITMAN as chief engineer at Caland's Steep Rock operations was announced concurrently with Mr. Pearson's.

W. D. Lyle is new manager of The South African Land & Exploration Company Limited at Brakpan, Transvaal. He previously was manager of the Welkom Gold Mining Company in the Orange Free State.

T. Nara and **K. Urable,** chief of the mining section and chief geologist, respectively, for the Mitsubishi Metal Mining Company, have completed an extensive examination of copper mines of Philippines.

C. A. L. Hogg has been appointed deputy minister in Saskatchewan's newly organized Department of Mineral Resources. The Hon. J. H. Brockelbank is minister.

Glen S. Wyman has been promoted to general superintendent of operations at the Chuquicamata operations of the Chile Exploration Company. Mr. Wyman's former post, mine superintendent, will be filled by **L. E. Fish.** Mr. Fish, in turn, is succeeded as assistant mine superintendent by **R. C. Becker.**

C. E. McManus is new project manager in charge of all operations at Hollinger-Hanna Limited, which is operating for the Iron Ore Company of Canada in the Quebec-Labrador iron ore project. Mr. McManus, who will direct operations at Mont Joli, Seven Islands area, and north to Knob Lake and mining areas, formerly was assistant general manager of Hollinger-Hanna Limited with headquarters in Montreal, Quebec.

Walter A. Sterling, vice president in charge of mining, **C. W. Allen,** manager of the mining department; and **Stanley W. Sundeen,** Ishpeming, all of Cleveland-Cliffs Iron Company, are currently touring iron ore exploration operations of Guyana Company, a Cleveland-Cliffs subsidiary in Venezuela. The drilling site is located about 60 miles west of the iron ore property of Orinoco Mining Company at Cerro Bolivar.

Donald O. MacLennan of New Aberdeen, Nova Scotia has been awarded the Canadian Institute of Mining and Metallurgy's Medal for Bravery in recognition of the courage he displayed in leading a rescue party into the danger zone of a colliery after a gas explosion had occurred. At the same presentation dinner **Dr. James B. Mawdsley,** head of the department of geological sciences at the University of Saskatchewan, received the Barlow Memorial Medal for writing the best geological paper which the Institute published during 1952. Awards for student essays and accident prevention also were included in the program.

A. Paulen, chief industrial engineer for the Dutch state mines, is now in Korea planning the reconstruction of South Korean coal and wolfram mining. He heads the mines section of the United Nations Korean Relief Agency.

Admiral Hughes Vinel and **M. Gean Majorelle,** president and vice president, respectively, of Societe Anonyme Des Mines De Fer De Mauritanie, French West Africa, recently toured the Mesabi iron range of Minnesota and the Steep Rock iron range of Ontario.

E. J. Longyear personnel now in Africa include **William Carlson, William Jones, Melvin Brugger, Derek H. Harris, Jack L. Nesheim, Harvey L. Sobel, W. Bruce Peterson** and **Robert T. Novotny.** Mr. Carlson and Mr. Jones are drillers at Fort Gouraud, French West Africa; Mr. Brugger is organizing geological surveys in Angola and Mozambique; Mr. Harris, an ex-South Afrikaan, and Mr. Nesheim are conducting geological studies in Mozambique; Mr. Sobel and Mr. Novotny are general geologists, and Mr. Peterson is mechanic and machinist. Longyear is handling exploration diamond drilling for Frobisher, Ltd., Canadian mining firm which is interested in opening up the large iron orebody in French West Africa. The company is also participating in the combined aerial and ground search for new mineral deposits in Angola and Mozambique which the United States and Portugal are undertaking jointly at a cost of nearly $2,000,000.

L. CHAPMAN (left) and R. LEWIS, foremen at the Tacoma, Washington, copper smelter of American Smelting & Refining Company, recently returned to the United States after visiting Mount Isa Mines Ltd., Mount Isa, Queensland, Australia. They assisted at the blowing-in of Mount Isa's new copper smelter and then inspected the custom smelter at Port Kembla, New South Wales, before returning home.

EARL M. IRVING, geologist for the United States Geological Survey, recently attended the Regional Conference on Mineral's Resources Development (ECAFE) in Tokyo, Japan as a delegate for the Philippine Islands. Mr. Irving is senior mining consultant in the Philippines for the Mutual Security Agency. MANUEL AYCARDO, JR., chairman of the Board of Examiners for Mining Engineers of the Philippines, also was a delegate to the conference.

James Y. Murdoch will occupy the newly created office of chairman of the board of Noranda Mines Ltd., of Canada and **J. R. Bradfield** will move up to a newly arranged vice presidency. Mr. Murdoch will continue as president, which he has been since Noranda's inception 30 years ago. Mr. Bradfield is an engineer who has also been with Noranda since beginning construction days.

Professor F. A. Forward, of the University of British Columbia, was one of the speakers at the recent annual meeting of the Canadian Institute of Mining & Metallurgy. He discussed the new leach process to be used by Sherritt Gordon Mines to treat nickel-copper cobalt concentrates.

Fred Johnson, formerly with American Smelting & Refining Company, now retired, has been visiting mining installation in Sweden.

Dr. W. J. Kroll, adviser to the U. S. Bureau of Mines, is on a three-week tour of Japan to give technical guidance to the Japanese titanium industry.

N. Varlamoff is now chief exploration engineer for Remina-Cobelmin, B. P. 73 Kigali, Ruanda Urundi, Belgian Congo. He previously was at Remina's Messaraba operations.

New officers of the Indian Institute of Metals are: **Phiroz Kutar,** president; **Professor M. S. Thacker, G. C. Mitter,** vice presidents; **D. P. Antia,** honorary secretary; **G. P. Chatterjee,** secretary; and **K. C. Sood,** treasurer.

John E. McMynn will become superintendent of mines, north cenrtal district, Consolidated Mining and Smelting Company of Canada, Limited. The appointment, which becomes effective June 1, follows the resignation of **C. E. White,** who will become general manager of United Keno Mines, Ltd. Mr. McMynn is at present property superintendent at Cominco's H. B. Mine.

Arvid E. Honkala has left Crystal Falls, Michigan to accept a new position with Minas de Matahambre in Province Pinar del Rio, Cuba.

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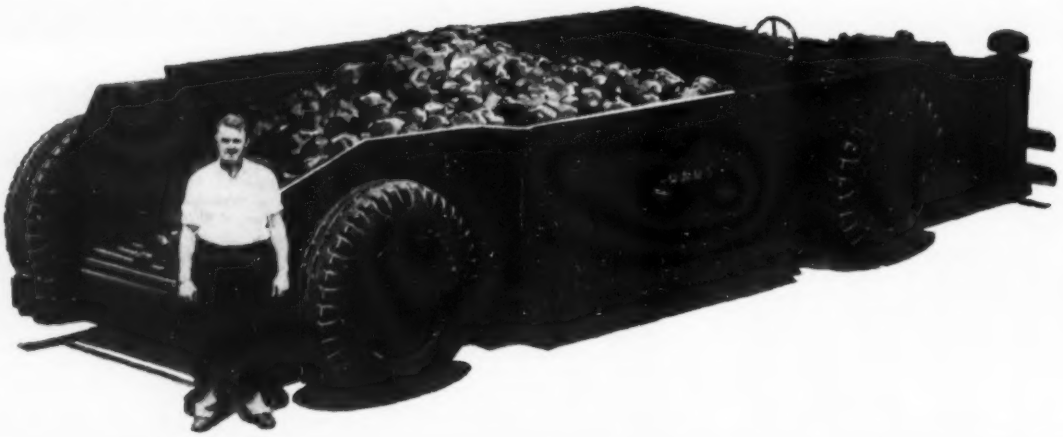

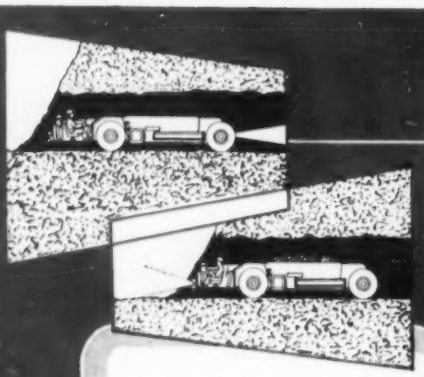

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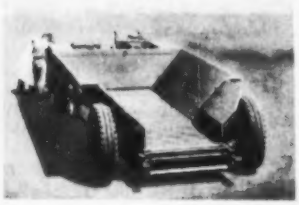

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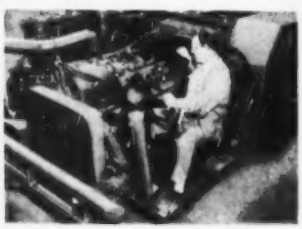

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INTERNATIONAL NEWS

ECONOMIC COMMISSION HOLDS MINERAL RESOURCES CONFERENCE IN TOKYO

The Economic Commission For Asia And The Far East held its first mineral resources conference in Asia in Tokyo, Japan late in April. Following the eight-day technical session, a series of field trips were held to the important Japanese mining and metallurgical centers.

Delegates from 17 nations were in attendance at the opening session to hear Dr. P. S. Lokanathan, India, executive secretary, address the delegates. He said, "It is generally recognized that this region as a whole has not been adequately explored." After hearing more than 80 technical papers, the delegates agreed that a speed-up in geological mapping must be achieved. Aerial photogeologic and aerial geophysical surveys were recommended as the best method to save time, personnel, and money.

Special reports were made on the iron ore resources of the region, on the nonferrous metals, bauxite deposits, sulphur and sulphur-bearing materials, ferro-alloy metal deposits, kaolin resources, and fertilizer raw materials.

Among those in attendance at the session representing the respective countries were: United States, Dr. Kung Ping Wang, chief, Far Eastern Branch U. S. Bureau of Mines; Dr. David Andrews, assistant chief, Foreign Geology Division, United States Geological Survey; Pexton Kerr, economic officer, United States Department of State. Australia, Dr. N. H. Fisher, chief geologist, Bureau of Mineral Resources. Burma, Dr. Ba Thi, director, Geologic Survey Department, Netherlands, Dr. G. L. Krol, chief geologist, Billiton Tin Company, Ltd. Philippine Islands, Manual M. Aycardo, geologist, A. Soriano & Company; J. C. Quema, acting chief, Mining and Metallurgical Division, Philippine Bureau of Mines. Russia, Michael I. Varenzov, Nicolay P. Semenko, Nicolay I. Generalov, Andrey M. Otaroschenko, and George N. Ilyinsky. England, E. Dixey, director, Colonial Geological Surveys. Malaya, Ian Lestie, Chief Inspector of Mines. France, Dr. Fernand Blondel, director, Office of Colonial & Mineral Geological Surveys. Japan, Dr. Sakuji Komagata, director, Agency of Industrial Science and Technology; Dr. Hidesabruo Aoyama, professor of mining and dean of the faculty of engineering University of Tokyo.

U. S. Negotiates Tungsten Contract With Bolivia

The governments of the United States and Bolivia and the management of the now-nationalized Patiño Mines and Enterprises Consolidated have concluded a three-way agreement whereby the United States General Services Administration will buy Bolivian tungsten at $63.00 per short unit. Bolivian President Victor Pas Estenssoro said that similar agreements are now being worked out with the former owners of the Mauricio Hochschild SAMI and Aramayo Mines in Bolivia Company.

The tungsten contract may clear the way for resumption of Bolivian tin sales to the United States, particularly since the Bolivian government and Patiño mines are discussing a preliminary agreement on the sale price of the latter's nationalized mines. President Paz Estenssoro said the United States had demanded that Bolivia reach a compensation agreement with the "Big Three" before tin sales could continue.

Of the $63,000 tungsten price, Patiño will receive $10.00 per unit as indemnization by the government for nationalization. Another $10.00 will be set aside to pay off a loan from the Export-Import Bank for development of Bolivian tungsten.

Delegates to the mineral resources conference of the Economic Commission for Asia and the Far East are pictured here at the opening session in Tokyo, Japan. The Russian delegates are shown at their seats in the center section, three rows from the back. Also shown are the delegates from Philippine Islands, Pakistan, the Netherlands (fourth row). Japanese delegates fill the four back rows in the right section.

Pine Point's Progress In Lead-Zinc Operation

Pine Point Mines Limited, a subsidiary of The Consolidated Mining and Smelting Company of Canada Limited, reported satisfactory progress in its exploration of the lead-zinc area on the south shore of Great Slave Lake in the Northwest Territories during 1952. Further determination of the size and values of certain orebodies will be continued through 1953, with sinking of a shaft on the schedule to determine actual mining conditions.

A favorable mineralized belt which extends for 36 miles is now covered by 1,274 claims. During 1952, an active diamond drilling program comprising 41,000 feet of drilling indicated several million tons of ore, about half of which is minable by open-pit methods.

A permanent townsite was laid out by the federal government. In the area reserved for them, Pine Point Mines has constructed bunkhouses, residences, a restaurant, and an office. Water sewage and power installations to the camp have also been completed.

A suitable area for shaft sinking was located during the year; the shaft was collared, and a headframe, dry, power house, and oil storage facilities were completed. An access road 80 miles long, linking the property with Hay River, was practically completed and will be finished in 1953. This will permit truck haulage from the railway at Peace River to the property. Total expenditure on the property is now over $1,600,000.

London Trading In Copper To Be Resumed August 5th

Private import and sale of copper on the London Metal Exchange will be resumed on August 5th. For the past 14 years (from September 1939) all copper trading in the United Kingdom has been under strict government control.

The necessary 90-day notice to all Commonwealth producers announcing the termination of the government's bulk buying arrangement was dispatched from London on May 4, according to Sir Arthur Salter, Minister of Materials.

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This Big, Fast, Hard-Hitting Shovel Is Making History in Metal Mining

The seven-cubic-yard dipper of the MARION 151-M is only one indication of the work it can do.

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The month-after-month dependability of the 151-M, except for routine maintenance, is another big factor in year-long production output.

Don't say "seven isn't enough" until you see what others are doing with the biggest seven-yard performer that ever hit the mine pits.

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OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

U. S. Steel Plans African Manganese Mining Project

Agreements have been completed whereby the Cie Minière de l'Ogooué (COMILOG) will develop and mine the extensive manganese deposits in Gabon, French West Africa. The deposits assay from 40 to 50 percent manganese and reserves have been reported as large as 50,000,000 tons.

COMILOG, in which the United States Steel Corporation has the largest (49) percent interest, will probably build a railroad and develop open-pit mines. First shipment of ore is scheduled for 1960 with United States Steel buying 300,000 tons per year. Associated with United States Steel in the project are French Overseas Mining Office (21 per cent), Compagnie Minière de O'ubangui Oriental (15), and Mokata El Hadid (15).

The ore bodies cover an area of about 36 square miles 32 miles northwest of Franceville. The tabular orebody is believed to be about 15 feet thick and covered by only a thin layer of soil.

Shipment of ore to the coast presents a problem as no highways or railroads exist. Either a new railroad or a connection with the Chemin de Fer Congo-Ocean Pointe Noire-Brazzaville railroad will probably be built.

Thailand Reserves Mineral Rights for Nationals

Thailand's Cabinet Council has decided to reserve rights to develop the country's natural resources to Thai nationals. The Council voted that forestry, mining, and fishing should be carried out by Thai nationals and that concessions should be granted to foreigners only if development is beyond the capital and technical knowledge of that country's subjects.

Before granting a concession to a foreigner or a foreign firm, the whole matter is to be carefully studied with conditions laid down to ensure development according to regulations. If a foreign firm requests renewal of a concession, and if no Thai nationals are in a position to take over operations, the manner in which the previous concession had been developed would be taken into consideration.

The policy, if strictly enforced, will hamper mining operations of 23 tin dredges owned by British and Australian mining companies in the southern part of Thailand. However, the government will not object to joint Thai-alien development projects which are considered of potential benefit to the country.

Nigerian Firm Expands Columbite Output for U.S.

Gold and Base Metal Mines of Nigeria, Ltd. will expand its columbite production in Nigeria with financial assistance from the United States Defense Materials Procurement Agency. Advances will be made up to a maximum of £250,000, and may be drawn until June 30, 1954. Repayment will be made in columbite concentrates, starting in 1954 and ending in 1956.

Present mining operations are by hand with a limited water supply, so modernization of operations will be started immediately. Dams are already under construction, and monitor, gravel pumping, and sluicing methods will be applied to the alluvial deposits.

The firm hopes to raise its columbite production from 26 tons in 1952, to 90 tons this year and over 150 tons by 1955. Tin output is also to be increased from 570 tons in 1952, to 670 tons in 1953, and over 750 tons in 1955.

Freeport Finds Large Cuban Nickel Deposit

Freeport Sulphur Company has discovered a large nickel deposit in the vicinity of Moa Bay, 500 miles east of Havana, Cuba, said to contain at least 40,000,000 tons of nickel ore.

The company plans to build a pilot plant for nickel recovery and also for that of cobalt. Freeport and Chemical Construction Company, a subsidiary of American Cyanamid Company, have concluded an agreement to collaborate in processing the ores.

MEXICO—An important sulphur deposit has been located near Coatzacoalcos by *Tellepan, S.A.* which has asked for a federal concession to work the deposit. The deposit is believed to be a continuation of that at San Cristobal in Vera Cruz which Mexican subsidiaries of the *Pan American Sulphur Company* are working. According to the Mexican National Geologists Association, the deposit was first discovered some years ago by *Cia. Petroleo Mexicana Aguila, S.A.* (*Mexican Eagle*), one of the major foreign oil companies that were expropriated by the federal government. El Aguila reportedly made the discovery while it was exploring for oil in a zone of the Isthmus of Tehuantepac.

VENEZUELA—Extensive deposits of phosphate rock have been discovered in Cerro Riecito in the Acosta District of Falcon State. Technicians sent by a United States firm to explore the region

MARCONA SHIPS FIRST IRON ORE

A first shipment of 10,000 tons of iron ore has been made by the Marcona Mining Company from its Peruvian property to the Fairless Works of the United States Steel Corporation at Morrisville, Pennsylvania. Regular shipments of from 5,000 to 10,000 tons will now be made every month. Marcona, a joint operation of the Utah Construction Company and Cyprus Mines Corporation, is well ahead of schedule in its development of this project. Drilling was only completed in November 1952. The building of ore handling facilities, widening and surfacing of the 22-mile truck road to the mine from the port of San Juan, and opening of the open-pit mine have all been achieved within a period of about four months. Construction work will continue for a while. The photograph above was taken in February. One of the ships carrying heavy mine equipment may be seen anchored in the harbor at San Juan Bay. Equipment was taken to shore by barges since the dock had not yet been erected. Note the dry, barren terrain with a climate characterized by off-shore winds. The new firm has a 20-year lease on the deposits from the owners, the government-controlled Santa Corporation. The latter has an option for use of up to 300,000 tons per year at below market price for the iron and steel plant it is planning at Chimbote. Estimated reserves run about 100,000,000 tons. Henry Brown is in charge of operations.

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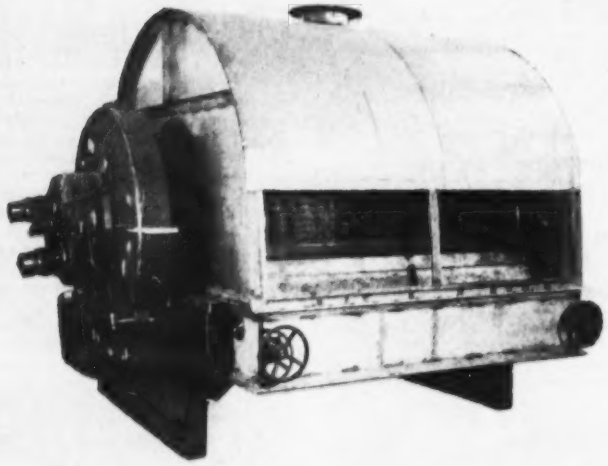

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estimate that there are about 15,000,000 tons of high quality phosphate rock and another 5,000,000 tons of reserve. Since the deposit is easily accessible, it is possible to begin development work almost immediately.

PERU—*Cerro de Pasco Corporation* reports that refined zinc was produced in significant quantities for the first time in 1952 at its *Oroya* smelter. Output of refined lead was at the highest level in the company's history during the year. A decline in copper production reflected the drop in the average grade of copper ore treated; copper ore reserves in the mines are presently diminishing. During 1952, the firm produced 10,883,528 pounds of refined zinc, compared with 1,838,787 in 1951; 121,988 dry short tons of zinc concentrate, compared with 108,623 in 1951; 108,137,936 pounds lead, compared with 98,264,834 in 1951; 44,864,447 pounds copper, compare with 53,595,427 in 1951; 9,156,706 ounces silver, compared with 7,335,165; and 31,461 ounces gold, compared with 32,128 in 1951. Net earnings declined to $7,263,979, compared with $13,798,045 in 1951, due primarily to the lower level of nonferrous metal prices during the year.

BOLIVIA—Three United Nations experts are currently examining the possibility of expanding and diversifying Bolivia's mineral production. The government recently requested a number of other experts to work with the *Mining Corporation of Bolivia*, the body which has been responsible for the operation of the tin mines since the nationalization of the tin-mining industry in April of last year.

MEXICO—When no private interests came forth to request a concession to develop the La Olvidad silver tract in Guanajuato, the federal government ordered the property incorporated into the national mineral reserves and placed under the control of the *Mining Stimulation Commission*. The tract has not been worked for some time. Three large silver tracts at Socavon de Nopal, Santa Fe, and Nueva Lux, also in Guanajuato, comprising a total of 100 acres, have been placed in the national reserve under the supervision of the commission.

EL SALVADOR—At the request of the government of El Salvador, a United Nations mission studied the conditions in the country and drew up an integrated plan for its economic and social development. One of the recommendations made was for the undertaking of a general geological mapping program which would include determination of underground water reserves in the most arid zones, and the creation of a mining research institute.

NICARAGUA—*La Luz Mines, Ltd.* has completed sinking of its shaft to the 1,325-foot level at Siuna. Stations have been cut on the 1,000-foot and 1,250-foot levels with a crusher station and loading pocket at 1,110 feet.

MEXICO—During 1952, *Compania Minera Santa Maria del Oro, S. A.*, a subsidiary of *International Mining Corporation*, milled 164,952 metric tons of ore. This produced 9,955.7 dry metric tons of concentrate assaying 89.44 grams gold and 12.64 percent copper per ton. The deficit for the year was $733,318.37, compared with a deficit of $637,805.65 in 1951. The company attributed the unsatisfactory showing to: the absolute taxes applicable under Mexican law which are not related to profits; increased operating costs, especially labor

and materials; fixed price of gold; and lower grade of ore milled. An independent investigation of the reserves, together with an appraisal of the property, has been undertaken by William G. Donaldson, consulting engineer of Berkeley, California.

HONDURAS—The *New York and Honduras Rosario Mining Company* reported a net profit of $623,014 in 1952, compared with $721,574 in 1951. The company owns silver and gold properties at San Juancito about 20 miles from Tegucigalpa.

COLOMBIA—During the three months ended March 31, *Asnazu Gold Dredging, Limited* dredged 1,414,200 yards to recover 5,590 ounces of fine gold; *Nechi Consolidated Dredging Limited* dredged 1,017,000 yards to recover 3,883 ounces of fine gold; and *Pato Consolidated Gold Dredging, Limited* dredged 3,650,600 yards to recover 38,789 ounces of fine gold.

BRAZIL—The national government has allocated $2,500,000 to the National Mineral Production Department for development of the country's minerals resources. Plans include studies on the boosting of mineral production, utilization of water power, and ore processing operations. Brazil's tremendous hydroelectric reserves should play a large role in development of these mineral resources.

MEXICO—Iron ore reserves in the Mexican states of Colima, Jalisco, Michoacan, and Guerrero are conservatively estimated at 74,000,000 tons by the Bank of Mexico's industrial investigations department. Bank geologists declare that these reserves are particularly important because of the high quality of their iron ore. They cite El Mamey zone, Colima, which has 12 deposits estimated to contain more than 20,000,000 tons of ore, averaging more than 64 percent iron with a smaller amount of sulphur and phosphorus. Michoacan has a deposit that alone is calculated to contain some 22,000,000 tons of high-grade iron, while Las Truchas in that state is calculated to contain 20,000,000 tons. In Guerrero, the Pluton tract has a known reserve of 5,000,000 to 6,000,000 tons, assaying 61 percent iron with little sulphur and phosphorus, and the Chutla tract has 3,000,000 tons of iron ore. The Hercules, El Calvario, and La Calera zones each are estimated to contain more than 1,000,000 tons of ore.

BRITISH GUIANA—A small quantity of an apparently new mineral containing over 80 percent Cr_2O_3 has been obtained from the Merume River Basin and the name Merumite has been suggested for it. An exploration party from *Barima Gold Mining Company (Canada) Limited* is expected to begin prospecting the area in 1953.

PUERTO RICO—In cooperation with the *Puerto Rican Economic Development Administration*, the *U.S. Geological Survey* has made a preliminary invesigation of a bentonite deposit located at the western end of the island about a mile and a half southeast of Aguado, Barrio Malpaso. Its existence has been known for some time but it had not been previously studied. Where exposed, the layer measures up to 30 feet in thickness, dips at an angle of about 24°, and appears to follow the regional structure of the surrounding volcanic rock. The report is on display in Washington, D.C. and at the Industrial Laboratories of the Puerto Rican Economic Development Administration at Hato Rey.

EUROPE

ITALY—Working party No. 9 of the *OEEC (Organization for European Economic Cooperation)*, which was formed to study utilization of low-grade ores, arranged for a group of experts from its member countries to visit laboratories and plants in England, Sweden, West Germany, France, and Italy last month. The mission was made up of 20 members, including Adriano Caperle, who represented Italy. In each of the countries visited, informal meetings were held during which time problems concerning beneficiation of various ores and minerals were discussed with local experts. A report will be submitted shortly.

AUSTRIA—The *United Aluminum Works* at Ranshofen produced 30,500 metric tons of aluminum during 1952. The increased power supply (boosted to 750,000,000 kilowatt hours) will permit a 1953 production of 36,000 metric tons, or 5,500 metric tons more than in 1952. The *Salzburger Aluminum Gesellschaft* at Lend recorded an output of 5,500 metric tons during 1952. After the benefits of increased power supply, total 1953 production should reach about 7,000 metric tons.

YUGOSLAVIA — Estimated reserves remaining at the *Bor* copper mine are set at about 70,000,000 tons of both open pit and underground copper ore. Content is considerably lower than in the veins developed so far—1.23 percent, compared with 5.04 percent, on an average. Experts claim that byproducts of the refinery could be increased. They say that over 50,000 tons of sulphur could be recovered annually, and that some 350,000 tons of slag are discarded every year, although this contains about 25 percent iron.

NORWAY—An explosion in the *King's Bay Coal Company's* mines at Ny Alesund in Spitzbergen killed 19 Norwegian miners on March 19. In the same mines, nine others were killed in an explosion in January 1952, and another 15 in 1948. The company has given orders to cease mining until further notice. Last year a mining commission sent to Spitzbergen recommended a number of security measures. These measures were in the process of being adopted when the latest mine disaster occurred.

ITALY—The *Montecatini Company* produced 971,000 tons of pyrite during 1952, out of a total of 1,126,000 tons for the entire country. Equipment is being modernized to further increase production. Sulphur mining is on the decline; however, Montecatini reports that it produced 71,000 tons in spite of the fact that one of its largest properties is nearly depleted.

FINLAND—Copper production increased to 18,317 tons during 1952, compared with 17,385 tons in 1951. All types of mine production are reported to have increased to 932,000 tons, compared with 849,000 tons in 1951.

UNITED KINGDOM—During the first quarter of 1953, production of steel ingots and castings reached a new high of 4,552,000 tons, compared with 4,261,000 in the fourth quarter of 1952 and 3,998,000 in the first quarter of 1952.

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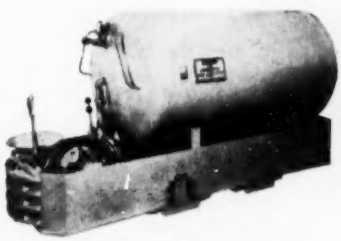

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AUSTRIA—The *Donawitz* plant of the *Alpine Montan Society* resumed production during the last half of April. The plant, working along with the *United Austrian Iron and Steel Works* in the research for a new refining method, has finished the 3½-year phase of studies to begin production of SK (Sauerstoff Oxygen-Konverter Stahl) steel. Its output will close the gap between the demands for steel and the present production rate. During 1953, the nationalized iron and steel industry hopes to produce between 1,100,000 and 1,400,000 metric tons of steel, and about 1,200,000 metric tons of iron ore.

SPAIN—It is reported that a group of geologists, geophysicists, and mining engineers are being recruited from Western Germany for the development of a uranium deposit in Spain. The deposit is said to underlie the Straits of Gibraltar and to touch Spanish soil at Algeciras. Additional deposits are believed to exist in the Granada area and in the Sierra Nevada Mountains. Hitler's one-time financial wizard, Dr. Hjalmar Schacht, is reportedly the guiding light behind German efforts to develop Spain's mineral resources.

AUSTRIA—A new ore-coke agreement provides that the *United Austrian Iron and Steel Works (VOeEST)* will deliver more coke to the *Alpine Montan Society's* Donawitz plants, in return for which it will receive more ore from the AMS's Styrian ore deposits. With the increasing production in the VOeEST's oxygen plant, the need for medium- to high-grade ore has been increased proportionately.

NORWAY—Production is scheduled to begin this summer at the Norwegian columbium mine at Soeve near Skien in southern Norway. Administration, laboratory, and warehouse buildings have already been completed. Output is scheduled to go to the United States during the first few years of operation.

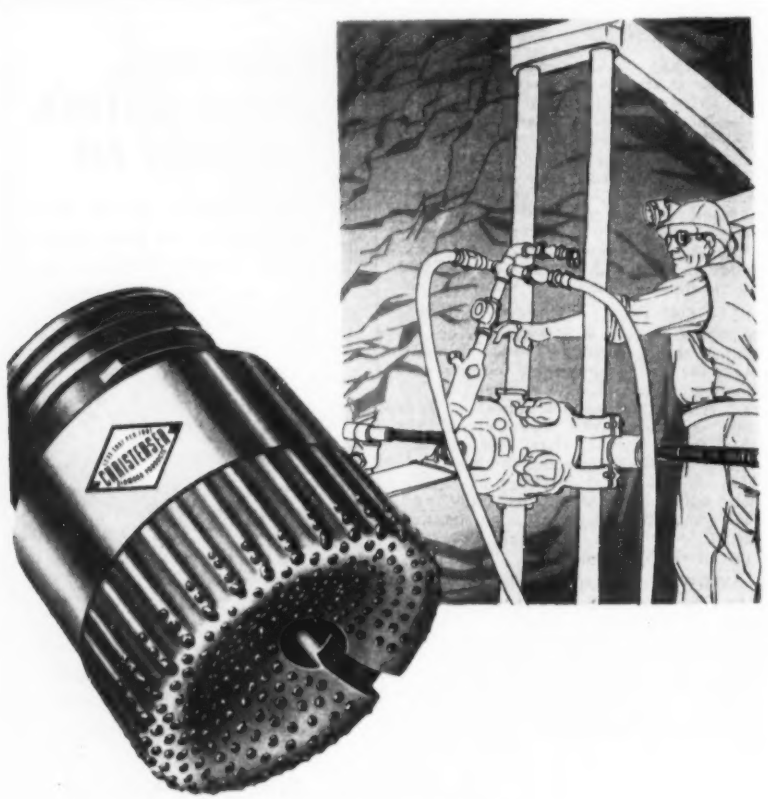
GOLD COAST—The Legislative Assembly has postponed for six months consideration of the government's bill to protect the African diamond industry by imposing a greater measure of control over diamond placering operations. The government has reportedly been considering setting up a Diamonds Marketing Board. The postponed bill was designed to protect both the persons legitimately engaged in the industry, and the government revenue from losses due to removal of diamonds by unauthorized persons. A few years ago the diamond mining industry was almost completely run by European companies. Today African miners operate so widely that their output is greater than that of the mining companies.

FRENCH GUINEA—*Cie. Miniere de Conakry* made its first shipment of iron ore from its new operation on April 9. Destined for the United Kingdom, the shipment amounted to between 8,000 and 9,000 tons.

ALGERIA—An advance of $680,000 will be made by the U. S. Defense Materials Procurement Agency for the development of Algerian lead production. A contract has been signed with a French-owned company in Constantine.

UNION OF SOUTH AFRICA—Arrangements have been made with the Atomic Energy Board of South Africa for the *Virginia Orange Free State Gold Mining Company Ltd.* to erect plants to extract uranium and to produce sulphuric acid. Research work has proven that uranium exists in payable quantities in the residue slimes of the company's gold production plant. The raw material for the sulphuric acid plant will be pyrite which will be recovered as a by-product from the residue slimes both at the company's mines and at other mines. The company will obtain loans to cover the capital cost of the plants; disposal of the products is assured for 10 years after the date of start of production. The uranium plant is expected to be ready in 1955 and the sulphuric acid plant in 1954. Initial mine production is expected to start in January 1954 at a rate of 50,000 tons per month. Immediately thereafter, the company expects to begin increasing the milling capacity to 75,000 tons monthly by not later than January 1955 and with further increases to 125,000 tons monthly after that. *Kennecott Copper Corporation* will buy additional stock to help finance the project.

LIBERIA—A total of 876,974 tons of Liberian iron ore were shipped by the *Liberian Mining Company Ltd.* in 1952. *(Republic Steel Company* has a 59 percent interest in the firm.) Because of its high iron content (68 percent), the ore is used directly in the open hearth fur-



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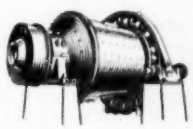

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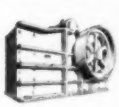

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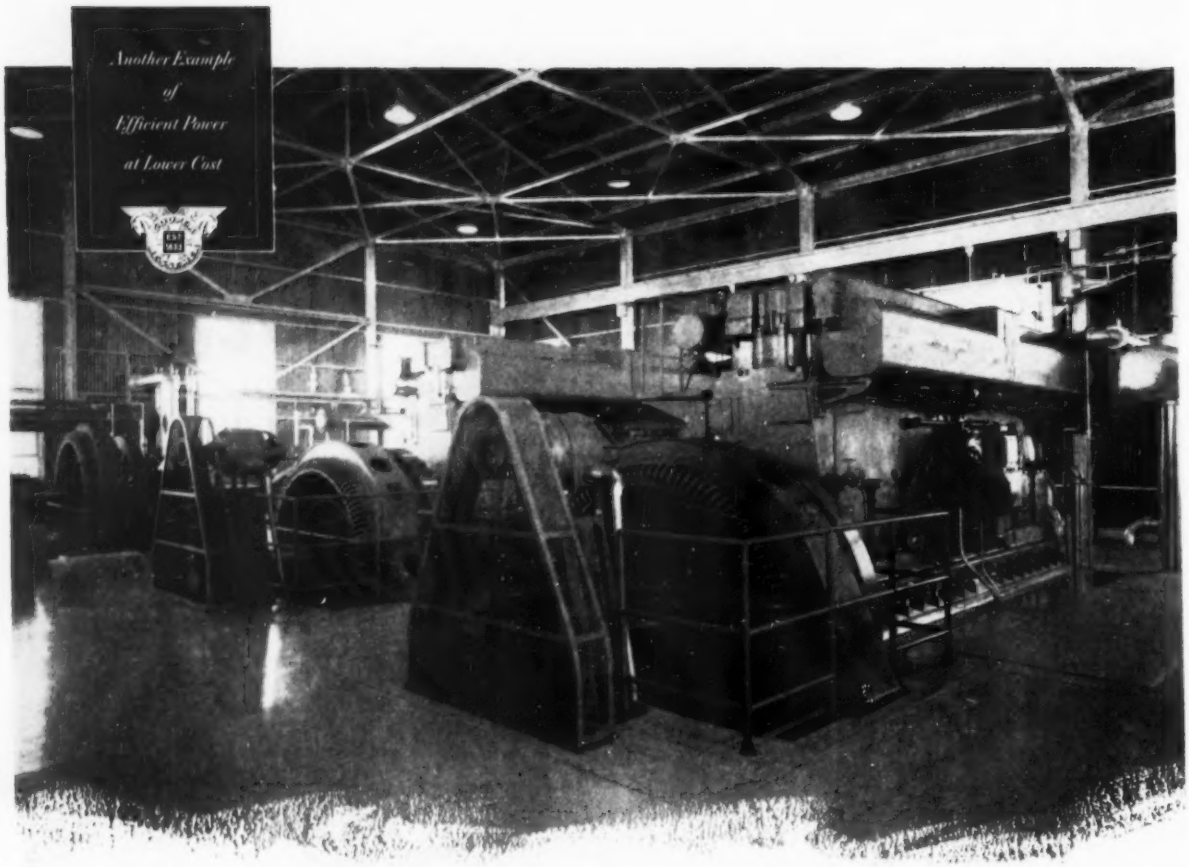

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naces. It is estimated that at least 30,000,000 tons of this high-grade ore are available. Rights to the concession were renegotiated with the Liberian government recently. Under the new agreement, royalties on the ore have been increased. At the end of a five-year period, the government will participate in the profits.

UNION OF SOUTH AFRICA—About 600 tons of copper have been salvaged from the Dutch steamer "Klipfontein" which sank off the East Africa coast in January. The steamer carried 1,500 tons. Salvage operations are continuing with 300 tons brought to Durban in April, worth about 300,000 guilders.

GOLD COAST—*Ariston Gold Mines (1929) Ltd.* produced the highest revenue in the company's history during the year ended September 30, 1952. The mill crushed 330,430 tons of ore from which 114,932 ounces of gold were recovered valued at £1,515,480. Increased tonnage and recovery, coupled with a higher price for gold, accounted for the higher value. A new 40,000 tons monthly capacity hoist will be erected and operating within the next 12 months; meanwhile, the present 30,000-ton monthly rate of crushing will be continued.

UNION OF SOUTH AFRICA—Latest reports from the *Free State Geduld Mines, Ltd.* at Welkom indicate that No. 2 shaft had been dewatered to the 5,194-foot level after being flooded for the second time (see MINING WORLD, March 1953, pp. 47, 85). From the surface, a concrete plug was poured from the 5,350-foot level to the bottom, and then dewatering began. Pumps were installed at the 3,000 level, the 3,880 level, and the 4,750 level as they were reached. The No. 1 shaft has been sunk 163 feet in Basal Reef footwall quartzite to its final depth of 5,517 feet. Shaft equipping is now under way and 424 feet have been developed in cutting the belt station.

FRENCH EQUATORIAL AFRICA—*Mid-African Exploration Company*, a subsidiary of *Newmont Mining Corporation*, has resumed diamond drilling and development work in the Niari Valley on a modest scale. Robert Paquette will supervise the diamond drill crews. Efforts to locate a single copper-lead-zinc ore body capable of supporting even a medium-sized operation had been halted in August 1952. After further geological reports and consultations, it was decided to resume the program in the hope that a profitable milling operation could be based on more than one ore body.

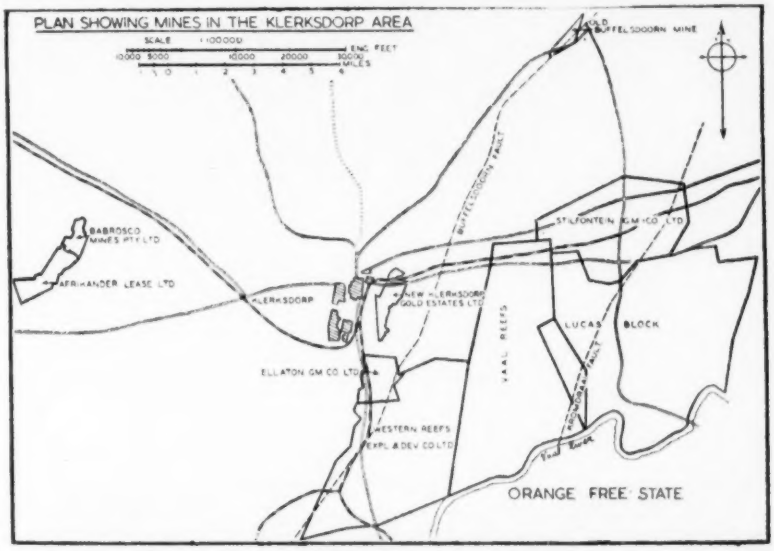
NORTHERN RHODESIA—IN January the *Nkana Mining Department* of *Rhokana Corporation Ltd.* hoisted a record of 176,500 tons of ore at Central Shaft, which is 7,500 tons greater than the previous best hoisted at Nkana mine in 1951. Two 10-ton skips are used for hoisting the ore, which is pulled from the 1600 level and from the 2600 level loading boxes. A six-day week is in effect, with the only stops made for weekly hoist and skips examinations. The 176,500 tons of ore may be translated as: 18,510 10-ton skips hoisted or 713 each day; 30 skips pulled from the 2600 level each hour and 40 skips pulled from the 1600 level each hour; on the levels, 34,323 cars trammed or 1,319 cars trammed each day; a total distance of 16,615 miles travelled by both skips, with the slips travelling at 1,500 feet per minute.

UNION OF SOUTH AFRICA—*West Rand Consolidated Mines, Ltd.'s* West Reduction Plant, which went into operation in October of last year (see MINING WORLD, December 1952, pp. 36-37), milled 128,000 tons before the year's end. The company also reports that the Deep Sub-Incline shaft, together with the necessary ore and waste passes, rope raises etc., was completed from the 47th to the 49th levels.

UNION OF SOUTH AFRICA—Orders totaling 54,000 tons have been received for the large stocks of manganese ore on hand at Durban. The United States has purchased 35,000 tons, the United Kingdom 16,500 tons, Sweden 1,000 tons, and Belgium and Holland 1,500 tons.

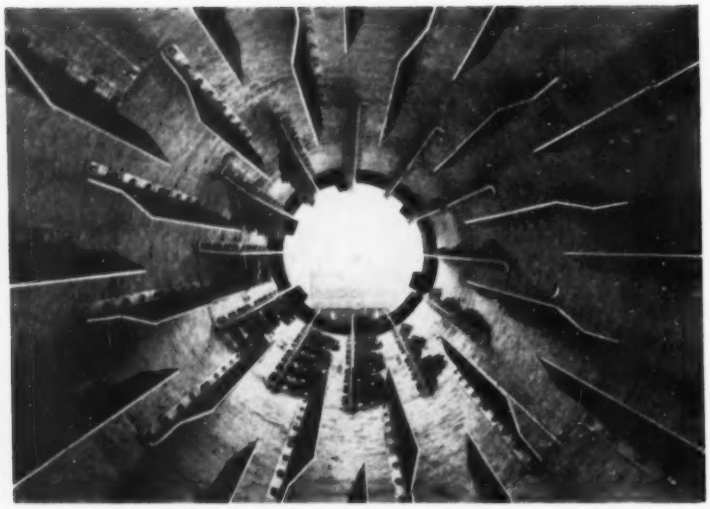
EGYPT—The geological survey of the *Aswan* reserves, underway for the past three years, was completed late in 1952. The results of the study are to be reported late this year (1953). Private exploration is on the increase—as of the end of 1952, 96 mining leases and 74 prospecting leases had been issued.

SOUTH WEST AFRICA—For the fiscal year ended June 30, 1952, *O'okiep Copper Company*, in which *Newmont Mining Corporation* owns a 56.3 percent interest, established new records for metal sales ex mine at $19,076,794, and net profit of $9,374,610. Smelter production of blister copper amounted to 23,622 short tons, slightly exceeding the previous year. Ore reserves were greatly increased by the discovery of and exploration of the Nababeep West orebody. Production for the six months ended December 31, 1952 showed 12,643 short tons of blister copper; metal sales ex mine $10,742,721; and a net profit of $5,371,441. A 50-percent increase in capacity of the mill was delayed because of a deferred delivery of machinery and electrical equipment, but is expected to become effective this year. The Nababeep leaching plant produced 2,263 tons of copper during the fiscal year 1951-1952, as compared with 1,004 tons during the previous fiscal year. The tungsten mine and mill are being equipped for production at an expenditure of $500,000 to fulfill a contract with the United States Government for the delivery of tungsten concentrates until March 31, 1958.



MORE SOUTH AFRICAN URANIUM MINES

The Klerksdorp mining area in the Orange Free State, Union of South Africa, seems destined to become as important a producer of uranium as it will be as a gold mining center. Four of the smaller gold producers in the district have already been added to the list of byproduct uranium mines: to the west of Klerksdorp (see map above) is Babrosco Mines (Pty.) Ltd. of the Strathmore Consolidated Investments, Inc. group, and its southern neighbor, Afrikander Lease Ltd. in which Central South African Lands and Mines Ltd. has the major interest; to the south of Klerksdorp and adjacent to Western Reefs Exploration and Development Company, Ltd. is Ellaton Gold Mining Company, Ltd., also of the Strathmore group; and more to the east is New Klerksdorp Gold Estates Ltd., a subsidiary of Mid Witwatersrand (Western Areas), Ltd. The uranium-bearing slimes from these four mines will be treated in a central uranium leach plant on the property of Stilfontein Gold Mining Company. Approval has been given for the extension of the Stilfontein uranium plant under this joint treatment plan; the company has also been authorized to construct an auto-oxidation plant to produce the sulphuric acid used in extracting uranium from slime. Cost of the extension and the acid plant is estimated at £1,500,000, and will be financed by loans from the United States and Great Britain. The milling rates per year of the four mines are as follows: Babrosco 140,000 tons; Afrikander Lease 170,000 tons; Ellaton 360,000 tons; New Klerksdorp 138,000 tons. The combined additional tonnage therefore is 808,000 tons per year. Ellaton is expected to reach the production stage at the end of 1953.



"Knock-Out" Chains Help in Drying

"Knock-out" chains in Ruggles-Coles Rotary Dryers overcome the difficulty in handling sticky materials. This is just one of the many features of single and double-shell Ruggles-Coles dryers which make them the most versatile of all. Bulletin 16-D-3.

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ASIA

INDIA—*Ooregum Gold Mining Co. of India (KGF) Ltd.* has decided to close down its mine in the Kolar Gold Field. The world's deepest gold mine, it has been operating at a loss of about £175 a day since January. 90 percent of the ore remaining is concentrated in the deepest portion of the mine, and mining in strict sequence of extraction is necessary for safe operation. As such, it is not possible to maintain an economic output from the mine. Cessation of operations will affect 3,500 miners. Ooregum has been producing gold for 75 years; in 1952 it produced 34,681 ounces.

MALAYA—*Pacific Tin Consolidated Corporation* showed a net profit of $2,017,073 for 1952, including $604,583 partial Malayan war damage awards, compared with $1,204,896 in the previous year. During 1952, the company sold 4,392,026 pounds of tin, compared with 3,861,297 pounds in 1951. The average price was $1.17 compared with $1.25 in 1951. Four dredges operated during the year—one in the vicinity of Ampang in the State of Selangor, one near Kota Bharu in the State of Perak, and two near Kampar in Perak. The company has showed a steady production increase since the resumption of operations after World War II; however, the rate of output declined during the latter part of 1952 and this situation is expected to continue until conditions in Malaya permit the development of additional mining properties.

TURKEY—*Turhal* antimony mine, which was owned but not operated by *Etibank*, has been sold to *Ozdemir Mining Company*. Ozdemir has antimony smelting facilities nearby and is planning a flotation mill for the newly acquired mine.

CEYLON—The government hopes to produce monazite and ilmenite from the extensive beach deposits in the northeast and southwest coasts of the island during 1953. 1952 was an unfortunate year for the mining industry in Ceylon, ilmenite being particularly affected because of the reopening of the Indian plant at Travancore which reduced the demand for Singa'ese ilmenite. Some gems were mined on the island during last year, notably sapphires, rubies, and alexandrite beryl, but reportedly no statistics were kept, and production was not along modern lines. Graphite, the principal mineral produced on the island, declined in production in 1952 because of the lower world prices than had existed in 1951.

CHINA—It is reported that the new Russian administrators have signed a trade pact with China which will help China to build new electric power stations. Under the agreement, Russia will also send mining and machine tools, as well as equipment for the chemical industry.

NEPAL—An aerial survey and geological mapping of Nepal is being carried out by the Indian Survey Department at the request of the Nepal government. The survey of the valley of Kathmandu has been completed and mapping work is now in progress on the basis of aerial photographs.

Setting the Pace For TACONITE PROCESSING

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ALMOST EVERY SINK FLOAT plant on the iron range uses *Low-Head* vibrating screens. Operators depend on these Allis-Chalmers screens for high media recovery, low maintenance, years of profitable service.

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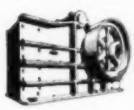
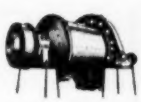

Jaw Crushers

Gyratory Crushers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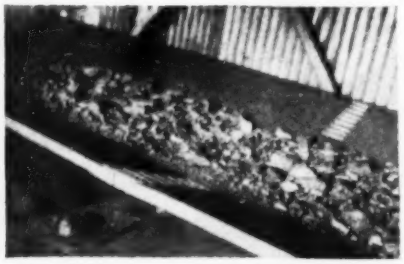

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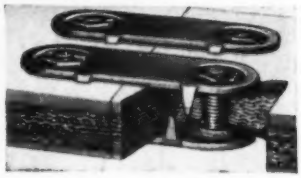

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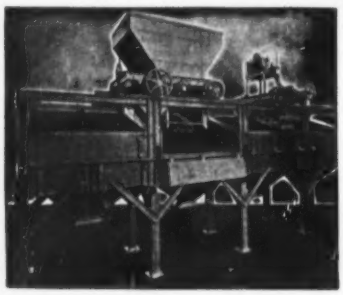

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INTERNATIONAL

JAPAN—*Nippon Mining & Smelting Company* is preparing to increase production at its *Mitsuhosawa* mine in Shizuoka Prefecture from 7,500 tons monthly to between 10,000 and 15,000 tons. The vein is six meters wide, and contains 1.2 percent copper and 18 percent sulphur. The firm carried out an extensive prospecting program in 1952 and also located unknown orebodies at several of its other mines: the *Ogoya* mine in Ishikawa Prefecture, the *Hanawa* in Iwate, *Nikko* in Tochigi, *Kamikita* in Aomori, *Shimmiya* in Ehime, and *Matsuo* in Miyazaki. In each discovery the veins carried copper principally, except at the Matsuo mine where the orebody contained 60 percent antimony.

INDIA—A 100-acre site in Mahul village, near Trombay island, in the State of Bombay has been selected by the Atomic Energy Commission of the Indian government for the location of its proposed uranium-thorium plant. Construction work has started and the plant is expected to go into operation in about 15 months. Annual output is to be about 205 to 228 tons of thorium nitrate.

INDIA—The government decided to reallocate the unshipped balance of the quota of 10,000 flasks of mercury, announced in October 1952, for export only to shippers who have used their earlier licenses. Such shippers will be granted further export allocations equivalent to the quantities actually shipped by them. These new licenses are valid through August 31, 1953.

TURKEY—Smelting facilities, including blast furnaces, open hearth, and rolling mills, originally planned for Edremit, will now be constructed at Eregli, a town at the Zonguldak Coal Basin on the shore of the black Sea. The new installations will cost about $150,000,000.

JAPAN—*Furukawa Mining & Smelting Company* is conducting further exploration work at its *Kune* mine where drifting recently proved a newly located orebody to be 400 meters long and three to six meters wide, carrying 2 percent copper and 14 percent sulphur. At the *Nago* mine, the company has a plan for construction of a modern milling plant which would be partly financed by a government loan. Drifting and sinking operations in the Nago have located another ore vein three to four meters wide, with an estimated recoverable ore reserve of 3,300,000 tons (1.2 percent copper).

NEW SOUTH WALES—A survey party led by the Government Geologist, C.S.T. Mullholland, is reported to have discovered radioactive minerals, some with low uranium content, near Broken Hill. The Federal Government Minister for Supply, H. Beale, says it is hoped this will lead to finding a large, high-grade deposit in the state. Along the South Coast, some molybdenite mines near Pambula may be reopened by the *Mundus Trading Company* of Sydney.

PHILIPPINE ISLANDS—*Philippine Iron Mines, Ltd.* shipped 663,395 dry metric tons from its open pit mine at Larap to the Japanese steel mills during 1952. This was an increase of about 100,000 tons over the preceeding year. Of the 79 ore vessels loaded, 42 vessels were under contracts Nos. 105, 106, and 107 at $9.15 per ton and the remaining 37 vessels were under the new 3,000,000-ton contract at $9.75 per ton, deliveries on which started in July. In July, a reduction of approximately 20 percent in scheduled ore shipments was forced on the mine by the buyers. Known ore reserves are estimated at 18,515,000 metric tons consisting of direct shipping ore, low-grade and eluvial ore, and high sulphur ore. A 3,000,000-dry-metric-ton contract signed with four Japanese steel firms provides for delivery over a three-year period ending June 30, 1955. A loan of $1,060,000 was made by *Kinoshita & Co. Ltd.* to buy new machinery, equipment, and supplies. With this arrival of all of this equipment, the waste stripping operations can be brought up to date. In 1952, a total of 1,037,106 cubic yards of waste was stripped. The underground mine was also started during the year. The service shaft was sunk to below the 250-foot level, and a haulage way started on that level. An intermediate service entry was started on the 195-foot level. The main ore hoisting shaft was sunk to a depth of 100 feet, and it is planned to raise under this shaft from the 250 level. By the end of the year, the company hopes to produce a good part of the ore from this underground section.

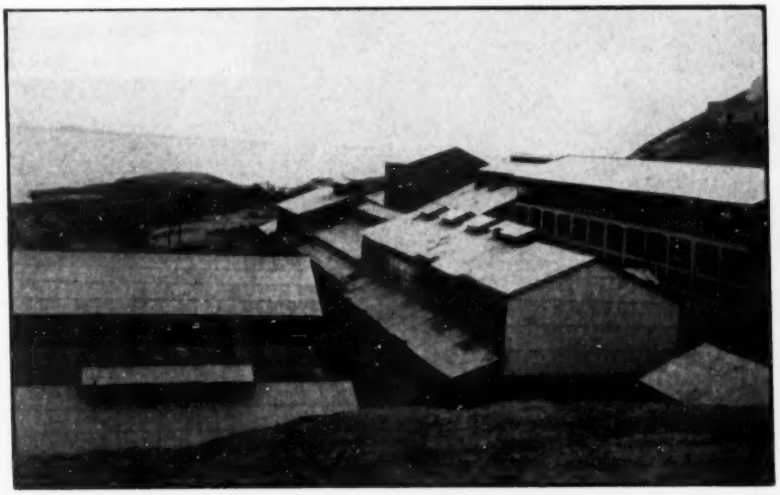
NEW GUINEA—Samples of nickel and chrome ore from West New Guinea's Cyclops Mountains are being assayed in the Delft Technical Laboratory. No conclusive assay reports have been received but two commercial firms are said to have applied for rights to work the deposits.

WESTERN AUSTRALIA — *Anglo-Westralian Mining Pty. Ltd.*, in which *Mount Isa Mines, Ltd.* holds a 35 percent interest, has ceased mining and milling lead ore at its *Protheroe* mine because of falling base metal prices, although development work is continuing. The ore body is small but of high grade, galena occurring in the lode as solid seams up to five feet wide and as massive lumps through brecciated and sheared gneiss. There is a little sphalerite but practically no silver. Ore averages 22 percent lead.

PHILIPPINE ISLANDS—The *Baleno Copper Mines, Inc.*, which owns and operates copper mines at Panal, Baleno, Masbate Province, was able to make its first small shipment of copper ore. The buyer in Japan was the *Taibo Company, Ltd.* of Tokyo. The ore ran 2.5 grains per metric ton of gold, 261.5 grains of silver, and 17.8 percent copper.

INDONESIA—During March, the first month of government operation of the tin mines on Banka Island, production of tin concentrates was 2,342 tons, compared with 2,886 tons in the same month last year. In February, the last month of private operation by the Dutch *Billiton Company*, output was 2,142 tons, compared with 2,321 tons in February 1952.

WESTERN AUSTRALIA—The *Blue Spec Mining Co. N.L.* of Nullargine is examining tantalum and columbium mining areas in the Pilbarra goldfield. The company's antimony mine recently reported development of a 35-foot winze averaging 61.6 dwt. gold and 11.8 percent antimony on a face 4 feet wide.



SOUTH KOREAN NONFERROUS SMELTER

Total exports of mineral products by South Korea during 1952 amounted to $19,691,316.00, a 200 percent increase over production in 1951. Contributing to this total was the Changhang smelter and refinery of Samsung Mining Company, shown above, which reopened in February 1952 after a long shutdown. It is the only nonferrous smelter in South Korea. Monthly production is 20,000 grams gold, 450,000 grams silver, 30 metric tons electrolytic copper, and 100 metric tons lead. A small 15-metric-ton-per-month electrolytic zinc unit is under construction. South Korean production of gold amounted to 7,613 ounces in 1951, and 18,636 ounces in 1952.

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1 shovel
3 trucks
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1 Tournapull

D Roadster drives into pit to begin loading. Water, caused by seepage from reservoir, does not slow operation or affect rig's 4-wheel air brakes. All material is selectively self-loaded from one 1200' pit.

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Dumping into bin for washing and grading at main plant. "D" also stockpiles cushion, concrete and masonry sand, and various grades of gravel, flint rock, and topsoil.

"D" strips pit... selectively self-loads various grades of sand, gravel... stockpiles finished material

Bowie Sand & Gravel Company supplies sand, gravel, topsoil and fill to contractors, home owners and cities throughout northern Texas. Material is usually obtained from one pit, and, up until a year ago, was hauled to the washing plant by shovel-loaded dump trucks. This method had several drawbacks. The shovel could not readily separate the various grades of material... production was low ... and the plant almost always behind in filling orders.

When company owner Sam H. Coffman opened a new pit, he decided to try a high-speed, rubber-tired D Tournapull for the complete loading and feeding job. Self-loading at all times, his 7-yd. "D" stripped topsoil and dirt which had been filled in... excavated and hauled sand and gravel to the hopper... and stockpiled various grades of finished materials for future sale.

"My D Roadster has replaced 3 trucks and one ¾-yard shovel on this job, and eliminated the wages of 3 hired men," reports Mr. Coffman. "I now sell everything from grass roots to the bottom of the gravel pit because I can keep it separated with my LeTourneau. We have also been able to stockpile 3,000 to 4,000 yards of reserve material, something we have never been able to do before."

Boosts output . . . delivers 100 cu. yds. hourly on 1500' haul

Coffman finds his 28 m.p.h. Tournapull particularly well adapted to this job because: (1) With this 1 machine, 1 man can handle entire load-haul-and-stockpile operation ... (2) In addition, by averaging 5 pay yards per load and completing typical 3000' cycles every 3 minutes, the "D" produces enough material to keep the entire plant busy... (3) Due to adequate supply of material at all times, plant production is increased sufficiently to allow plant crew enough time during the regular 8-hour day for overhauling the Company's 5 dump trucks and other equipment. Since starting job, "D" has worked over 1600 hours, with no down-time for mechanical troubles.

These are but a few of the reasons why leading pit and quarry operators are using Tournapulls for the lowest-net-cost-per-yard. It will pay you to see your LeTourneau Distributor and check your pit costs against modern Tournapull economy. He can give you all the facts, or arrange for a demonstration of the "D" on your job.

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AFTER completely satisfactory performance at the American Zinc Company plant at Mascot, Tenn., The American Cyanamid Company, as technical representative of the American Zinc, Lead & Smelting Company, has approved the STEARNS Type "MWI" Magnetic Separator for use in Heavy-Media plants. In operation in the Heavy-Media process in the concentrating of zinc ore, the STEARNS Type "MWI" Separator recovered better than 99.9% of the magnetic ferrosilicon.

The STEARNS Type "MWI" Magnetic Separator is equally adaptable for the recovery of media in Heavy-Media plants for the processing of all types of ores. This includes iron ores, fluorspar, rock products, coal, and similar materials. Specialized STEARNS Magnetic Separators are available for the recovery of other media such as magnetite.

Whether your problem is that of purification, reclamation, or concentration, STEARNS has a separator for you. From the fairly simple job of tramp iron removal to the concentration and beneficiation of complex ores, STEARNS has EXPERIENCE ENGINEERED equipment to meet your specifications.

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PHILIPPINE ISLANDS—Preparations are now in progress for the construction of plants in Bohol by *General Base Metals Inc.* for the purpose of treating the ores to raise their manganese content and reduce moisture. The machinery and equipment necessary for this purpose were obtained from Japan. The company loaded approximately 1,200 tons of manganese ore during the first week of March for shipment to Japan. A previous shipment of 4,100 tons was made in January.

NORTHERN TERRITORY—*Territory Enterprises Pty. Ltd.* has made rapid progress at Rum Jungle. A temporary power plant is operating and camps have been extended while a township has been planned. Six houses are finished. A new main shaft is being sunk. Uranium ore production should begin this year and full treatment capacity of the concentrator is expected next year.

FIJI ISLANDS—The *Emperor* gold mine of *Emperor Gold Mining Company Ltd.* is reported to have found ore described as of major importance. It is located southeast of the Wallace Smith shaft at Vatukuola and averages 9 dwt. per ton.

QUEENSLAND—Ore production of *Mount Isa Mines Ltd.* was a record in March with 54,000 tons of lead-zinc and 34,500 tons of copper ore. Metals for the month: lead bullion 3,195 tons; silver 271,575 ounces; zinc concentrate 3,500 tons; copper 1,003 tons. Copper output is increasing and is over 40 tons daily from about 1,300 tons of ore.

NEW GUINEA—*New Guinea Goldfields Ltd.* in March produced 1,223 ounces of bullion at Golden Ridges and 96 ounces at Edie Creek; 702 ounces were produced at Koranga.

PHILIPPINE ISLANDS—*Coco Grove, Inc.*, controlled by *Marsman and Company, Inc.*, may be closed down. Last year it operated the 6,000-cubic-yard-capacity "Mary Angus" dredge on the upper Paracale River in Camarines Norte with a loss of Pesos 172,258.42, not including depreciation. 1,560,000 cubic yards were dredged with an average recovered value of Pesos 0.31 per cubic yard, while the actual operating expense was about Pesos 0.40 per cubic yard. Drilling results in the headwaters of the Paracale River were disappointing and definitely eliminated areas up river from the ground dredged by the "Mary Angus." This leaves the upper Malaguit River as the largest undrilled section of the property which may not be much better.

VICTORIA—Recent returns from dredges operated by the *Central Victoria Gold Dredging Co. N.L.* show that the "Jim Crow" dredged 110,000 cubic yards to recover 500 ounces of gold, while the "Ampitheatre" dredged 92,000 cubic yards for a recovery of 450 ounces.

PHILIPPINE ISLANDS—The *United Paracle Mining Company, a Marsam & Company, Inc.* mine, operating at Paracle, Camarines Norte, closed down temporarily on April 11 on the ground that it can no longer pay increased wages and salaries of its 400 employees. High taxes and material costs as well as the loss of the main Balwarte vein ore body through flooding last year are other causes. Destroyed by the war and only rehabilitated in 1950, the company was treating its complex gold-copper-lead and zinc ore in a 300-ton flotation mill for a small profit in 1951 but lost heavily in 1952.

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PROBLEM:

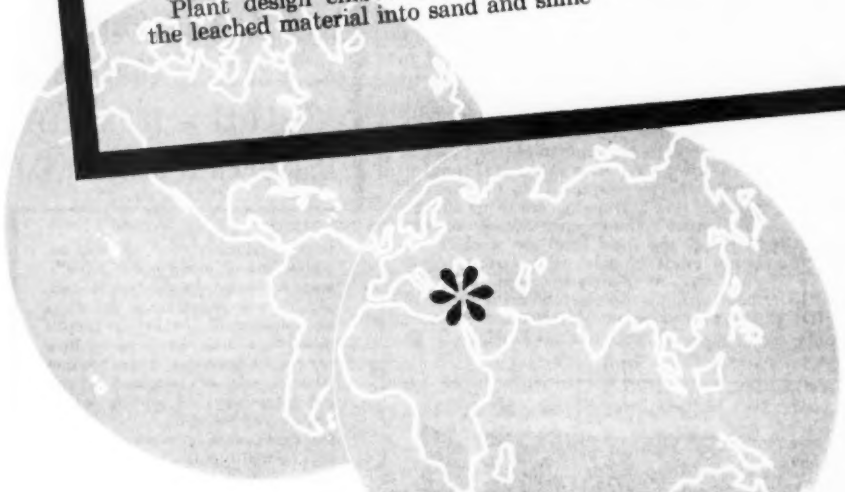
Investigate the possibilities of leaching pyritic copper ore, to recover acid soluble copper which was non-recoverable in an existing flotation plant in the Near East.

HOW THE PROBLEM WAS SOLVED:

The Dorr Company's Consulting Engineering Department in Stamford was engaged to determine the feasibility of the project and its requirements. As a first step, laboratory investigation was carried out at the Westport Mill and preliminary design data assembled which proved the project practical from the standpoint of engineering and economics. Upon client approval, Consulting Engineering designed a complete plant to leach 2,000 long tons per day of minus ½ inch copper ore with 4% sulfuric acid containing ferric iron.

Plant design embodies separation of the leached material into sand and slime portions, washing of sands in four counter-current Classifiers, and of slimes in four counter-current Thickeners. Combined washed sand and slime then goes to the existing grinding and flotation plant and the pregnant solution to iron cementation for recovery of the dissolved copper.

The Thickeners and Classifiers required for the washing steps in the revised flowsheet were supplied by The Dorr Company, U. S. A. The Dorr equipment installed in the initial flotation plant was supplied from our Associated Company, Dorr-Oliver, Ltd. of London.



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QUEENSLAND—*Ravenshoe Tin Dredging Ltd.*, purchaser of the dredge of *Barrytown Gold Dredging Ltd. (New Zealand)*, expects to become a public company soon, and to call for capital in order to develop tin leases in the Mount Garnet area. The Queensland government has guaranteed an overdraft up to £A200,000 advanced by the Australia and New Zealand Bank. The company's leases are 12 miles from the new area which *Tableland Tin N.L.* is preparing to dredge at Smith's Creek. The Smith's Creek area is reported to contain 50,000,000 yards averaging 11 to 46 ounces of tin per cubic yard.

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Mining and Consulting Engineer
Examinations—Valuations—Management
420 Madison Ave., New York 17, N. Y.
Cable: MINEWOLF Tel.: PLaza 9-1700

FRENCH OCEANIA—Makatea Island continues to be the scene of a phosphate mining development carried on by the *Compagnie des Phosphates d'Oceanie* which mined around 220,000 tons in 1952, and 252,000 in 1951. The phosphate for the most part is shipped to Japan.

SOUTH AUSTRALIA—*Weaber's Rising Sun, N.L.*, registered in Adelaide, has taken over copper-bearing leases three miles north of the *Peko* mine at Tennant Creek in the Northern Territory. Another Adelaide company with Territory interests is the recently formed *Poseidon Scheelite N.L.*, shares in which will be held partly by *Pioneer Scheelite N.L.* and *Kangaroo Mining Company, N.L.* Pioneer Scheelite has a mine at Hatches Creek in the Northern Territory, and Kangaroo Mining Company has a lease nearby.

NORTH AMERICA

YUKON TERRITORY—*Prospectors Airways Company Ltd.* has taken an option on a new nickel discovery near White River in the Yukon Territory, and has started diamond drilling. Inspection by the company's geologist had disclosed a wide mineralized zone showing nickel-copper sulphides. According to Canadian reports, two United States firms have joined in the venture—the *DuPont* interests and *Phelps Dodge Corporation* with a combined holding of 30 percent. *Noranda Mines Ltd.* has 15 percent of the stock and *Kerr* interests have 5 percent.

QUEBEC—*Ascot Metals Corporation Ltd.*, has announced the discovery of an entirely unknown ore structure east of any previously known ore area in the Suffield region. The ore outlined by surface drilling is sizeable, and both grade and width are stated to be comparable to those at the *Suffield* mine, some 3,000 feet to the south. Development at the Suffield mine is now advancing ahead of current production requirements. Newly opened stopes at the third level are producing a better grade of gold, silver, copper, lead and zinc ore than anticipated from diamond drilling. Re-elected to the board of directors of Ascot Metals were Allen E. Rosen, L. T. Porter, Fred E. Hall, G. D.

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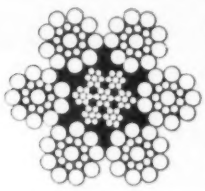
The rugged conditions of slusher service call for specialized ropes, engineered to suit the job. Few applications for wire rope involve the severe crushing, jerking, heavy loading, and abrasion to which these ropes are subjected. This is a job for Tiger Brand Monitor Steel special slusher ropes.

TIGER BRAND 6 x 19 Seale Excellay with a wire core is the "work-horse" slusher rope. It offers the best combination of strength, crushing resistance, abrasion resistance, and flexibility for average slusher operations.



All slusher ropes should be specified Excellay—produced by the preforming process which increases flexibility, resists kinking, and keeps protruding broken wires to a minimum. Because broken strand ends don't unlay like ordinary rope, Excellay preformed ropes can often be salvaged after damage which would ruin others.

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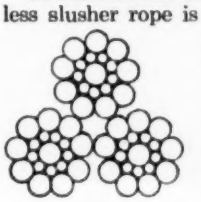

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Monitor Steel has no equal for mining-rope applications and is available only in U·S·S American Tiger Brand Wire Rope. For advice on the best type of Tiger Brand Monitor Steel Wire Rope for your mining-rope jobs, you're welcome to the services of a Tiger Brand Field Specialist. Contact your local distributor or write to the Columbia-Geneva Steel Division, United States Steel Corporation, 1403 Russ Building, San Francisco 6.

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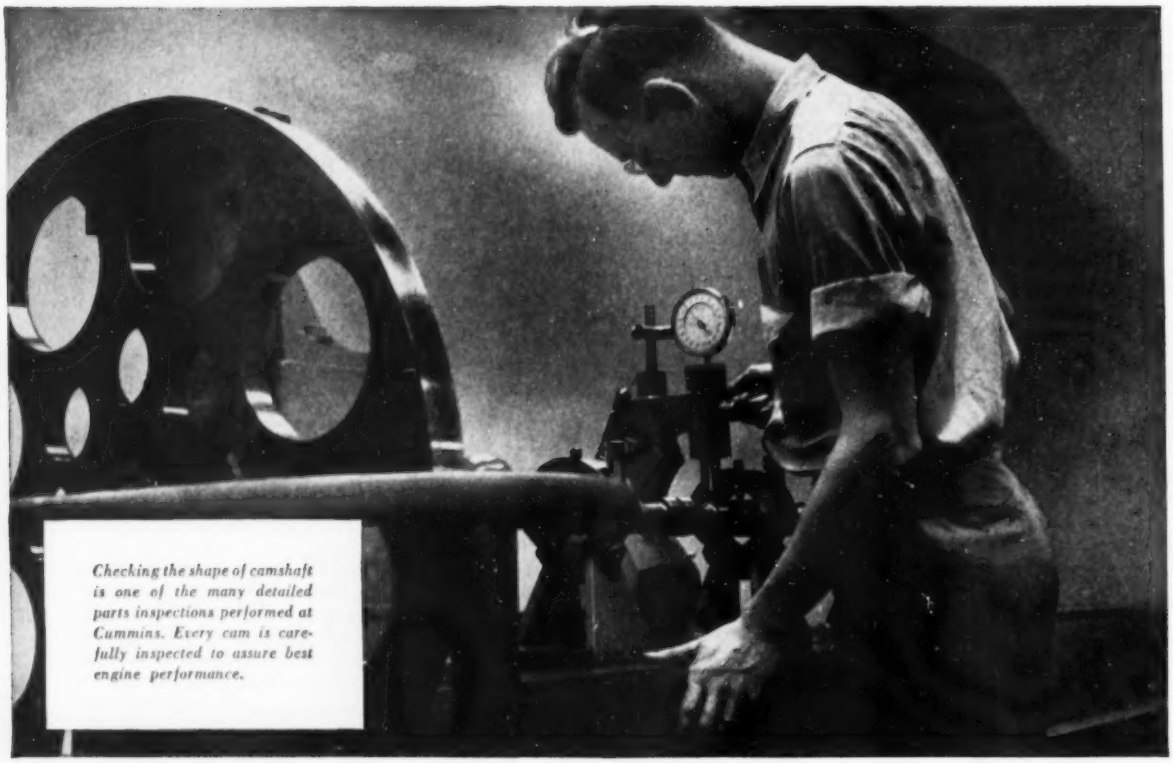

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(4-2-53)

Poole, H. J. O'Connell, and H. A. Friedman. Officers of the company are: A. E. Rosen, president; T. L. Porter, chairman of the board; Fred E. Hall, vice-president and general manager; and J. Murray Anderson, secretary-treasurer.

ONTARIO—Diamond drilling at the Sudbury properties of *Ontario Pyrites Company* has outlined large tonnages of ore additional to the 4,300,000 tons estimated late last year. Five holds have lengthened the known ore occurrences at least 1,200 feet to the west in the area between No. 1 and No. 2 shafts at the main *Errington* property. The known Rheaume and Christie ore bodies between sections 200 east and 1,500 feet west have been enlarged, as well. Current drilling is designed to determine the ore potential rather than to block out ore. It is hoped to place in sight at least sufficient ore to justify building a plant using a process that could recover the metals in the ore, rather than to erect a flotation mill which means lesser returns from mining operations. Metallurgical test work is being continuously carried out using the flotation process and a roast-leach method, so that the company may have the knowledge of full comparative advantages. The flotation test work has been conducted to a point where results have shown that a good zinc concentrate can be obtained with 50 percent zinc and a combined copper-lead concentrate assaying 22 percent copper and 13 percent lead, with good recoveries. The roast-leach work is in the preliminary stages, but tests point to good recoveries with few mechanical difficulties to be overcome. At the *Vermillion Lake* property of Ontario Pyrites, the 750-foot level station of the new shaft will be completed very shortly and sinking will proceed to 900 feet. When this shaft is completed, diamond drilling will be feasible to depths of up to 1,500 feet. A double-drum electric hoist is being installed to replace the air-driven sinking hoist, and the large Diesel engine from No. 1 shaft at Errington mine will provide electrical power. This will result in more air being available for the underground lateral work and diamond drilling which is to commence very shortly.

ALASKA—Frank Thesen has returned to his mining property on Slate Creek, a tributary of the Koyukok River. His partner, E. H. Durand, will join him later.

NEVADA—The *California Tungsten Corporation* has purchased the option in the *Linka* tungsten mine, previously held by the *C & C Tungsten Mining Corporation*. Owner of the property is Stephen Linka. The new owners plan to sink a three-compartment shaft and to erect a 100 ton concentration mill. The property consists of four claims and is located about 20 miles east of Austin in Lander County, Nevada.

SASKATCHEWAN—Reports from *Rix Athabaska Uranium Mines Ltd.* indicate that drifting in ore is now proceeding at the 150-foot level. In the west drift at the 150-foot level east drift, material comportedly been opened, with the average $58.00 a ton over the drift width. In the 150-foot level east drift, material comparable in appearance was in evidence. Both drifts are being extended along the hanging wall ore body and will be continued for the indicated distance of commercial values (about 350 feet in each direction). A contract for 10,000 feet of surface diamond drilling has been concluded with *Bradley Bros.* of Noranda and two heavy-duty surface rigs are being moved in for the drilling program. A diamond drill station is being established at the 300-foot level from which diamond drill holes are to be put down to explore the ore zone to as much as 500 to 600 feet below the level.

QUEBEC—An agreement has been reached between *Canadian Javelin Foundries and Machine Works Ltd.* and *Industrial Associates, Inc.* of Cleveland, Ohio, whereby the Cleveland firm will market 1,000,000 tons of iron ore and 150,000 tons of titanium annually for the next 10 years from Canadian Javelin's *Tache Bourget* property. The ore will be mined and beneficiated on a contract basis. Only the North American rights have been assigned to Industrial Associates.

ONTARIO—*Barvue Mines Ltd.'s* 4,000-ton daily mill rate is on the increase. From the first of the year until April 24, the mill treated 316,480 tons averaging 2.74 percent zinc for an output of 11,448 tons of concentrate running 60.52 percent zinc and containing 197,890 ounces of silver. There were also 210 tons of lead concentrates averaging 19.55 percent and carrying 15,757 ounces of silver. During a subsequent week, the mill rate increased to 4,340-tons per day, and in a single week handled 30,331 tons averaging 3.24 percent zinc for production of 1,124 tons of 61.30 percent concentrate containing 23,325 ounces of silver. (See MINING WORLD, March 1953, pp. 40 to 45, for a complete report on Barvue's operations.)

QUEBEC—The Quebec Department of Mines has released a geological report covering about 200 square miles of territory, about 50 miles north of Seven Islands. The district, known as the Nipisso Lake region, was investigated in 1952 by the department, and small per-

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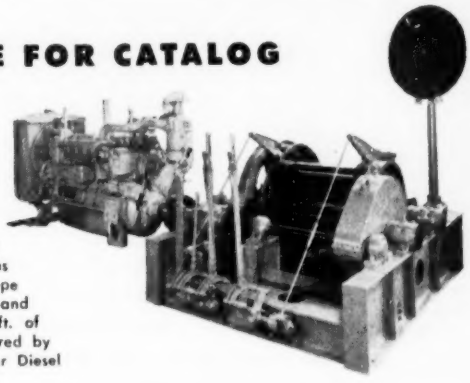

No. 23R Vulcan-Denver hoist with Cotta heavy duty transmission, double post brakes, cast steel gears, herringbone primary gears, rolled steel drums. This portable unit has a rope pull of 5000 lbs, rope speed of 335 ft. per min., and rope capacity of 2000 ft. of ⅝ in. rope. It is powered by a 94 H. P. Caterpillar Diesel Engine.

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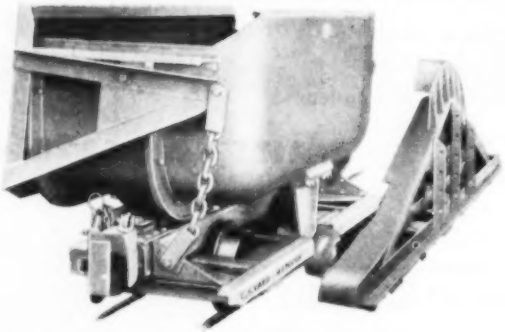

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centages of nickel and copper were found in some of the rocks in that area.

BRITISH COLUMBIA – *Bralorne Mines Limited* reports that during the first quarter of 1953 46,438 dry tons were milled for a recovery of 17,826 ounces of gold. The "77" vein developed ore averaging 0.45 ounce on the 22nd and 23rd levels but recently became very narrow on the 22nd level. The 24th level on the "77" vein west is being driven through the Empire Fault to prospect for the "53" vein. The "93" vein, while narrow, has been better than mine average over stoping widths on the 26th level. To date this vein is narrow and low grade on the 25th level. A drift was started east on the 21st level to prospect for the continuation of an ore shoot from the 20th level on the "51" vein.

YUKON TERRITORY–During the 1952 season, *Yukon Consolidated Gold Corporation Ltd.* dredged 5,863,491 cubic yards from which gold production was valued at $1,900,880.41. This production came from the operation of seven dredges: No. 3, Klondyke River; No. 4, Bonanza Creek; No. 6, Granville; 8, Middle Sulphur; 9, Upper Sulphur; 10, Dominion Creek; and 11, Hunker Creek. Dredge No. 3 completed its work and has since been dismantled. The other dredges are to work during the 1953 season, and the hydraulic operation on Paradise Hill will be continued.

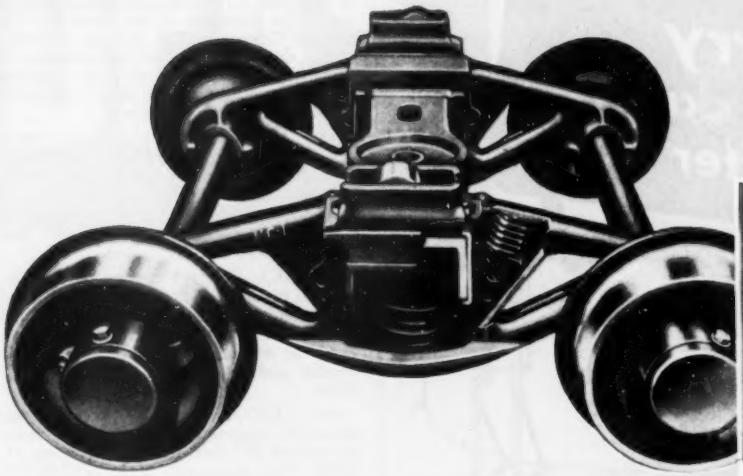
ALASKA–*Alaska Juneau Gold Mining Company* whose operations have been shut down since 1944 has granted a short-term conditional option on some of the firm's physical assets for the establishment of a wood pulp manufacturing industry on its property at Juneau. Included in the arrangement is the company's power plants. If a satisfactory company is formed, Alaska Juneau would be a stockholder. Also, the pulp company would supply Alaska Juneau with electric power as needed to enable it to resume mining operations if a higher gold price is attained.

ONTARIO–The *Prospectors & Developers Association*, reportedly alarmed at the attempt of the Ontario Department of Mines to reactivate its power to grant concessions for exclusive prospecting on large land tracts, has asked the government to delete section 8, Bill 67, from the Mining Act. The Association has also recommended that the annual budget of the Department of Mines be increased by $1,000,000 for the purpose of expanding geophysical and geological investigations.

ONTARIO–A low-grade magnetite deposit two miles north of Campbellford may be developed by *Pickands Mather & Company*, according to various reports. The deposit is said to be sizeable and amenable to concentration. It was drilled by *Trent River Iron Ltd.* last year.

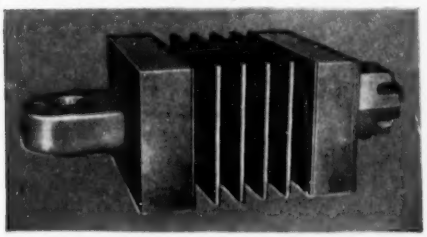
MARYLAND–Studies conducted by the U.S. Bureau of Mines at its Eastern Experiment Station at College Park, Maryland, have revealed additional evidence that titanium is one of the most corrosion-resistant metals in the world. The experiments showed that Bureau-made titanium did not corrode when coupled with magnesium, zinc, aluminum, iron, copper, or stainless steel in a three percent salt solution–approximately that of sea water. All other metals, except stainless steel, did corrode.

ALASKA–*United States Smelting Refining and Mining Company* plans to have six dredges in operation at Fairbanks during the coming season, and four at Nome.

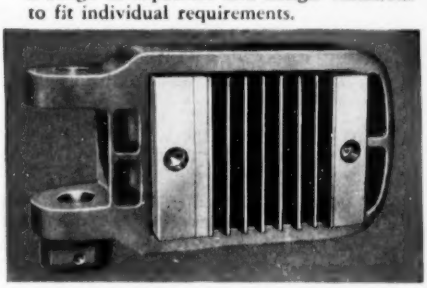


The NC-1 Truck climaxes 20 years of intensive research, providing (through the friction control mechanism shown in cutaway) protection to equipment, roadbed and lading with maximum wear life.

Willison Automatic Couplers save time with maximum safety . . . can be coupled at either end of car or locomotive . . . require no manual assistance. Close coupling eliminates damaging slack, permits high speeds with maximum stability.



National M-230 Rubber-Cushioned Draft Gear for cars operating through rotary dump. Soft initial-action, high-capacity rubber pads provide maximum impact protection, lengthen equipment life. Available in a range of capacities and design variations to fit individual requirements.



M-225 Rubber-Cushioned Draft Gear for locomotives and large capacity cars not required to operate through rotary dump. Maximum protection in minimum space.

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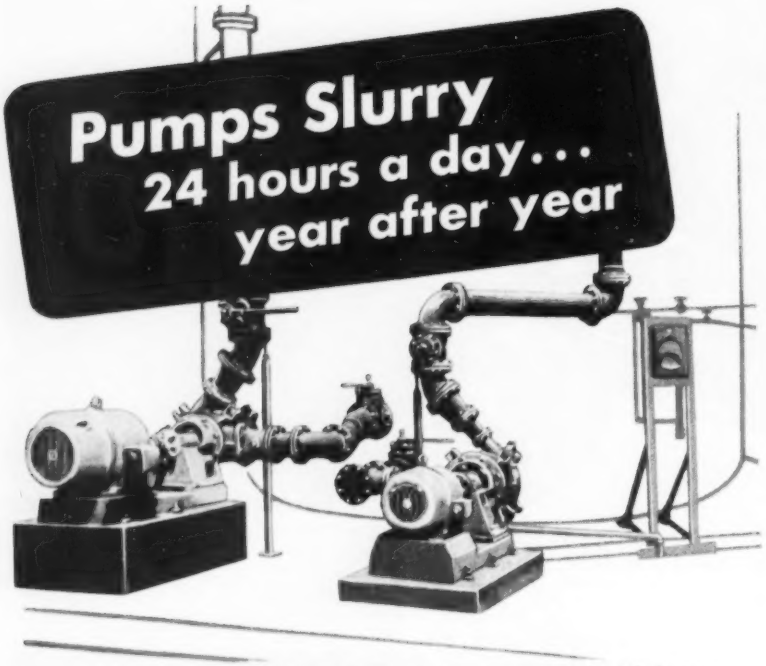

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MORRIS *Centrifugal Pumps*

MASSACHUSETTS–A new U. S. Atomic Energy Commission laboratory is in operation in Winchester, Massachusetts under the direction of the *American Cyanamid Company.* The primary objective is the development and improvement of processes for the recovery of uranium from low-grade ores and other low-grade uranium-bearing materials.

ONTARIO–*Falconbridge Nickel Mines Limited* reportedly will open its *Mount Nickel* mine on the south rim of the Sudbury Basin as a part of its new expansion program. The mine is a shallow one, said to contain about 300,000 tons of nickel-copper ore.

ALASKA–Caspar Ellengen plans to return to his mining ground on Deadwood Creek in the Circle district after being closed down for the winter. Mr. Ellengen was one of the first prospectors in the district and has been mining there since 1894.

ONTARIO–*International Nickel Company, Inc.* reported its proven ore reserves at 256,355,903 short tons at December 31, 1952. This compares with 253,704,771 tons at the end of 1951. Nickel-copper content was 7,795,326 short tons, compared with 7,693,122 tons at the end of 1951. Oxygen flash smelting of copper concentrates was carried out on a commercial scale during the year. Large-scale production of liquid sulphur dioxide, obtained as a byproduct, was initiated by *Canadian Industries Limited* in a new plant built at Copper Cliffs. The company spent $4,967,450 on exploration for new nickel sources during the year, as compared with $2,593,908 in 1951.

SASKATCHEWAN–Drifting operations on the 150-foot level at *Rix-Athabasca Uranium Mines Limited* showed a total advance of 126.6 feet east and west, with pitchblende mineralization continuing in both drift faces and giving high scintillometer counts. Two surface drills are operating on the property, one of which is being used for a deep test of the Smitty ore extension at depth, and below current workings. The second machine is drilling the section of the St. Louis Fault structure and midway between the Leonard and Smitty ore zones, where a previous exploratory hole, put down in this sector, obtained three intersections of ore-grade material. An underground drill, located in the second level shaft station, has started work and will explore the radioactive zones which lie parallel to and in the footwall of the main hanging wall zone. Shaft preparations for the changeover from bucket to cage and cars are being completed, and construction of a tram trestle from the shaft bin to the ore dump is underway.

QUEBEC–Latest reports from *Ascot Metals Corporation Ltd.* cite an improved financial position, a strong forward ore position, and materially higher prospective profits when ore is drawn exclusively from the *Suffield* properties. All production operations are to be concentrated at the Suffield mine where the bulk of the good grade ore is located. Ore blocked out on three sides at Suffield is estimated at 496,100 tons, averaging 0.006 ounce gold, 2.21 ounces silver, 0.93 percent copper, 0.62 percent lead, and 5.67 percent zinc after allowance for 20 percent dilution.

ONTARIO–*Juno Metals Corporation, Ltd.* of Toronto is planning to reopen the *Reliance Silver-Cobalt* mine near Cobalt, Ontario. Following de-watering and reconditioning, extensive underground drilling is planned.

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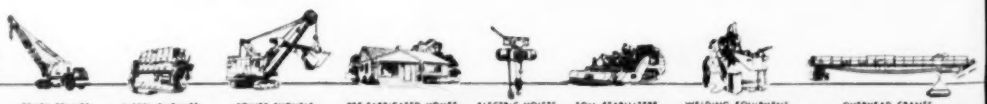


NORTHWEST TERRITORIES—*Calder-Bousquet Mines Limited* has acquired three groups of claims in the Beaverlodge uranium mining area, one 16-claim group of which adjons the *Rix-Athabasca* and *Goldfields Uranium Mines* acreage now under development. Calder's new property covers a total of three groups of 16, 7, and 2 claims, respectively. A number of pitchblende occurences have been revealed in preliminary prospecting and surface work. Diamond drilling, geological mapping, and detailed surface prospecting is being considered.

ALASKA—A map and profile of the Cascade Creek and vicinity has been published by the United States Geological Survey. The map is based on surveys carried on during the 1949 and 1950 field seasons, and was made to show basic terrain data for the evaluation of water-power resources and classification of the public lands in the area.

ONTARIO—*Trent River Iron, Ltd.*, a subsidiary of *W. S. Moore Company*, a Minnesota iron ore mining and contracting company, is continuing its explorational operations in eastern Ontario with anticipations of locating additional reserves of magnetite iron. Trent Iron is presently exploring the *Bristol* mine, located about 40 miles west of Ottawa near the Quebec boundary. Work has outlined a substantial tonnage of magnetite iron. The property may call for both open pit and underground operations. Two miles north of Campbellford another magnetite deposit of about the same proportions has been reportedly outlined by drilling.

QUEBEC—*Eastern Metals Corporation, Ltd.*, in Montmagny County 65 miles southeast of Quebec, reports excellent results in first lateral tests in its unique nickel mine which boasts two new nickel minerals—polydymite and violarite. Initial concentration tests of material from the first two high-grade rounds opened at the 175-foot level have shown a concentrate grading 18 percent to 30 percent nickel can be turned out as against a 3 percent to 5 percent tops at Sudbury where iron forms a large constituent of the ore. Thirty feet of high-grade nickel ore have been opened with the last face averaging 3.28 percent nickel over drift width of about 7 feet. Drift faces have run as high as 4.72 percent nickel. Sixty tons of muck from the last round averaged 2.44 percent nickel. Large widths are to be anticipated from the surface drilling. One hole 100 feet ahead and 75 feet below the level gave 1.09 percent nickel and 2.25 percent zinc over 15 feet.

NORTHWEST TERRITORIES—*Cui-Por Uranium Mines and Metals Limited* has acquired a 17-claim, 600-acre property in the Beaverlodge uranium area, in close proximity to the properties of *Rix Athabasca Uranium Mines Limited*, and *Goldfield Uranium Mines, Ltd.* The small amount of work completed to date has shown 18 pitchblende-bearing zones in association with two strong topographical features, which probably represent major fault zones.

QUEBEC—M. J. Boylen, president of *Chibougamau Explorers Ltd.*, reports, "steady progress in the development of the property towards the production stage." A three-compartment shaft has now reached a depth of 600 feet, and it is proposed to cross-cut the ore zones as soon as the shaft reaches a depth of 800 feet. It is expected that the ore body will be fully developed by midsummer on five levels.

U.S.A. Metal & Mineral Prices

METALS

May 22, 1953

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	29.75¢-30.00¢
	Lake. Delivered, destinations U.S.A.	33.00¢
	Foreign Copper. Valley basis	29.75¢-30.00¢
LEAD:	**Common Grade.** New York	13.00¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	$166.50
ZINC:	**Prime Western.** East St. Louis	11.00¢
	Tri-State Concentrate, 60% zinc, per ton	$65.00
ALUMINUM:	**Primary 30 Pound Ingots (99%) plus).** F.o.b. shipping points	20.50¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	34.50¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$2.00
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.40
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.00¢
MERCURY:	**Flasks.** Small lots, New York	$197.00-$200.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery, Port Colburne, Ontario	60.00¢
TIN:	**Grade A Brands.** New York (Price per pound)	121.50¢
TITANIUM:	**99.3%** + (Price per pound)	$5.00-$7.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:		$90.00-$93.00 per ounce
ZIRCONIUM:	**Powder,** 100 pound lots, per pound	$7.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado	$45.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$46.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$34.00-$35.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$54.00-$56.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports.	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.70
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$9.85
	Old Range Non Bessemer. Second quarter	$9.95
	Old Range Bessemer. Second quarter	10.10
	Swedish, Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit	20.00¢
MANGANESE ORE:	**Metallurgical grade.** 46 to 48% Mn. Long ton unit	$1.15-$1.17
	Chemical grade. 80% MnO_2. Per ton	$70.00
	U. S. Government ore purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treatment costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana; base price of $6.43 per long dry ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) **$2.30** per unit with premiums and penalties.	
MOLYRDENUM CONCENTRATE:	90% MoS_2. F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$65.00
	Foreign. 65% WO_3 Per short ton unit	$50.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock.	Per Pound V_2O_5, $0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois-Kentucky mines	$42.50
	Mexican. 70% f.o.b. border	$30.00
	Acid Grade. 97% CaF_2 f.o.b. Kentucky, Illinois, Colorado	$60.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

		Per Metric Ton	May, 1953 USA Equivalent cents per pound[1]
COPPER:	**Electrolytic**	£253 0s 0d	31.62¢
LEAD:	**Refined, 99.97%**	£82 15s 0d	10.34¢
ZINC:	**Virgin, 98%**	£70 15s 0d	8.84¢
ALUMINIUM:	**Ingot, 99.5%**	£161 0s 0d	20.125¢
ANTIMONY:	**Regulus, 99.6%**	£237 10s 0d	29.62¢
TIN:	**Standard, 99.75%**	£762 10s 0d	95.31¢
TUNGSTEN:	**Long ton unit, 30Ss, equivalent to**		$42.70

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

You pick the job!

WHAT's the toughest blading operation you've got? Ditching? Bank-sloping? If you want to see it done better, easier, with more work output per hour, watch a Cat* Motor Grader handle it.

Watch the operator change through the full range of blade positions in one minute without leaving his seat! Get into the seat yourself! Notice how the operator has a full view of his work without standing up. Check the steady production with no stops for adjustment.

Your Caterpillar Dealer is ready to demonstrate any of the three models—No. 212, No. 112, or No. 12. Fair enough? Call him today.

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

SINKER ROCK DRILLS

DO MORE WORK— in less time—at lower cost!

30 lb.
No. 28

Ideal for light to medium drilling and block holing up to 6 feet deep. Spring wire retainer optional.

IN ALL THE WORLD there are no other tools in their class to equal the performance and endurance of THOR Rock Drills! For Shaft Sinking, Block Holing, Augering, or Exploration, THOR tools are FIRST IN THE FIELD.

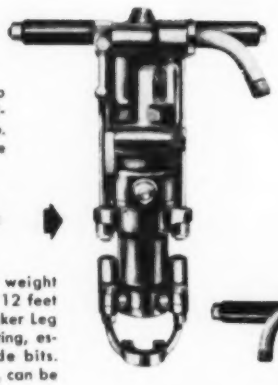
Famous lightweight, short-travel tubular valve provides EXTRA POWER with minimum air consumption for *each* of these great Sinker Rock Drills. All have cushioned piston action, powerful blowing, strong rotation, automatic lubrication . . . giving greater speed, power and ability to do more work, in less time, at lower cost.

For on the job demonstrations consult the Thor distributor nearest to you.

Thor Power Tool Co., Aurora, Illinois, U. S. A.

35 lb.
Nos. 33 and 35

Designed for secondary drilling up to 8 feet deep. Light weight for drilling horizontal and upward holes. No. 35 is equipped for full line pressure blowing.

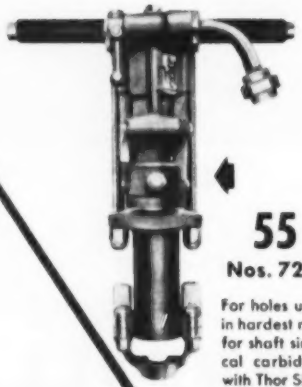


45 lb.
No. 38

All-purpose, medium weight Sinker for holes up to 12 feet deep. Mounted on Sinker Leg can be used for Drifting, especially with carbide bits. With Thor Stoper Leg, can be adapted to stoping.

80 lb.
No. 85B

Where conditions call for a hand-held drill to sink holes up to 25 feet deep in hardest rock, this husky, powerful sinker is your best tool for heaviest duty service. Recommended for heavy duty shaft sinking.



55 lb.
Nos. 72 and 75

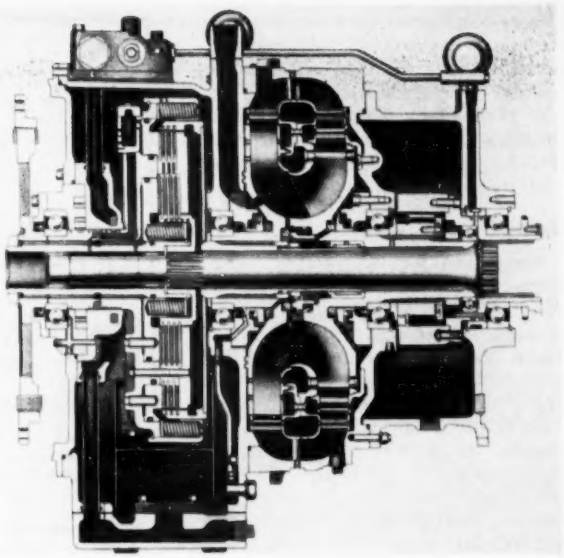
For holes up to 20 feet deep in hardest rock. Recommended for shaft sinking. For economical carbide bit drifting, use with Thor Sinker Leg or Air Bar Feed.

Thor PORTABLE POWER TOOLS

ELECTRIC • PNEUMATIC

Truck Torque Converters Save Money On Tough Mine Hauls

By W. B. Gibson*
Sales Manager Hydraulic Division
Twin Disc Clutch Company
Rockford, Illinois



Cutaway view of Model DF converter, showing freewheel mounted at rear (on right in photo) which permits output shaft to overrun converter turbine for mechanical drive when desired. Four-position control valve (upper left) is fingertip-controlled by operator for direct drive, converter drive, converter braking, and neutral. Concentric clutches (on left, mounted on shaft) are involved in all four operations.

According to reports from mining industry management, a critical need exists today for means of reducing operating costs with all types of heavy off-highway trucks. Steadily increasing labor and maintenance costs point to an even greater squeeze on profits in every mining organization utilizing trucks for transportation of materials. Principal complaints include time lost in gear shifting—excessive pedal braking—downtime for repairing engines, gears, axles, and brakes damaged by overloading on steep grades —lack of flexibility in interchanging drivers and units—complaints from drivers vainly trying to maintain fast work cycles with inadequate power range.

Two Advantages

By providing the only truck-type converter which delivers both peak torque multiplication and converter downhill braking, Twin Disc is gaining increased acceptance in the unusually difficult hauling encountered in the mining field. These two advantages—both controlled entirely by the operator's toe on the accelerator—are meeting head-on the personnel and maintenance headaches of mine hauling. The growing acceptance is due in the main to the combined advantages of 6:1 torque multiplication (highest in the field) and the exclusive converter braking feature.

For starting and on steep upgrades, the operator simply steps on the accelerator to draw torque exactly as needed. On the downgrade, by lifting his foot from the accelerator the operator utilizes the energy-absorption ability of the Model CF to automatically provide smooth, effortless braking up to 70 per cent of the engine's rated horsepower. This is effected by the free wheel, (mounted between the converter impeller and turbine) which forces the driving wheels to drive the converter throughout the descent. Pedal braking is used only for slight checking on curves, and for sudden stops.

Operating Results

On the Mesabi Range, the Model CF is installed on 30-ton-payload Dart trucks, mounted between Cummins Diesel engines and four-or five-speed close-spaced-ratio transmissions. Negotiating grades up to 16 percent, the trucks are climbing and descending fully loaded. Management reports a 50 per cent saving on brakes and brake drums alone, and the elimination of nearly all uphill gear-shifting and 90 per cent of pedal braking.

Bagdad Copper Corporation has installed the Twin Disc converters on a group of Dart 140-TC trucks, with Fuller 5-FS-1220 transmissions, powered by Buda-8-DAS-1125 350-hp supercharged Diesels, at its Bagdad, Arizona open-pit operation. Best evidence of performance is summed up in a report from Bagdad's general manager: "The Twin Disc torque converter is doing a wonderful job. The trucks negotiate the steep grades fully loaded without ever shifting gears—and return downgrade without using the brakes. The grades from shovel to crusher bin or waste dumps vary, from no grade up to 16 percent. We are of the opinion that the torque converter will revolutionize heavy off-highway hauling equipment. And the operating costs of the Torque Converter-equipped trucks now average less than 5 cents per ton—half that of similar units without the Twin Disc torque converter drives."

Another Twin Disc installation at Bagdad—one which is being watched closely by the mining world—is on the monstrous new Dart Model Sixty truck, which was fully described in the April 1953 issue of MINING WORLD on pages 73 and 74.

Iron Range Reports

The report from Pickands-Mather Company's West Hill iron ore mine near Coleraine, Minnesota is similar. Steep grades are being negotiated without shifting or braking, and drivers claim substantial relief from the fatigue of manual operation. Pickands-Mather has the Model CF installed on a Dart truck, Model 140.

In addition to elimination of shifting and braking, absorption of load shocks, and reduction of maintenance and operator fatigue, users of the converter also report substantial increases in work cycles for every hour of operation. This gain is also a result of peak torque multiplication plus the automatic converter drive and converter braking features.

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* *Graduate of the United States Military Academy. During World War II was in charge of the Fort Knox army installations directing the development program of torque converter transmissions for heavy military equipment, including tanks, trucks, and heavy towing equipment. In private industry, he has worked for the Oil Well Supply Company and the American Telephone and Telegraph Company.*

The combination of these two performance features enables truck engines to maintain their efficient rpm range, even on steepest grades under peak loads. This is particularly important with trucks used in mining, for here the gross poundage per net horsepower is extremely high.

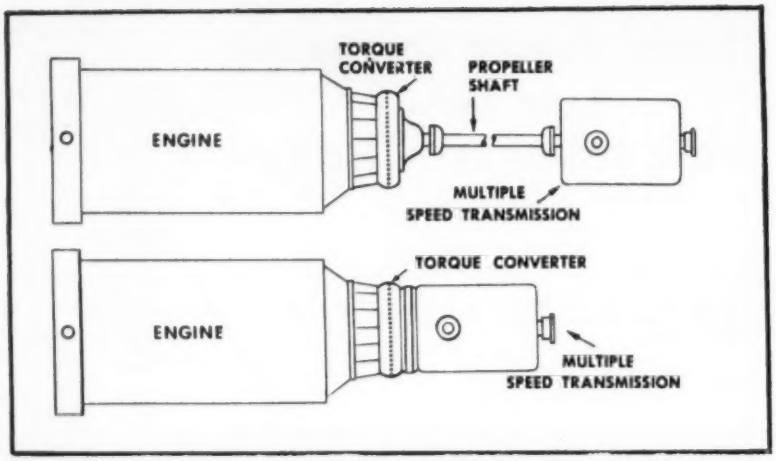
Selectivity of Drives

Since mining operations entail some longer hauls with extended flat terrain as well as steep grades, mining management also is interested in the Twin Disc Model DF torque converter. It develops the same up-to-6:1 torque multiplication as the Model CF, but differs in design to permit selective direct mechanical drive, selective converter drive and converter braking; all three operations are controlled at the driver's fingertips.

These exclusive Twin Disc features are accomplished through a cam and roller-type freewheel and two concentric oil-actuated clutches. For steep uphill pulls, the valve is turned to converter drive—causing oil pressure to engage the outer of the two built-in concentric clutches. This brings torque multiplication into action, matching the load demand with torque as needed. On the downgrade, the operator switches the valve to converter braking. Here both clutches are engaged, forcing the driving wheels to turn the converter—as in the Model CF—for powerful, effortless braking action, and limiting pedal braking to checking on curves and emergency stops.

Fuel Economy on Flat Runs

Where the road levels off on long, flat runs, the operator shifts to direct drive. The outer clutch releases and the inner clutch engages—permitting the truck's drive shaft to overrun the converter and provide direct mechanical drive without rotation of the converter turbine, to achieve maximum fuel economy and speed.



TOP: Schematic drawing showing remote hook-up transmission mounting, using propeller shaft. This method—preferred where space permits—offers flexibility, reduces weight on flywheel housing.

BOTTOM: Schematic drawing showing direct connected engine-converter-transmission hook-up, designed to meet minimum overall length requirements. This method provides compactness for on-and-off-highway trucks with short wheelbases.

Both the DF and CF torque converters are currently being produced in two sizes, designated as Series 10,000 and 11,500. Each series has seven capacities to accommodate the majority of engines—gasoline, Diesel, or butane—being used in mining. Both models are engineered to connect with a multiple-speed transmission, if desired, for extreme variations in operating conditions and are designed for installation in any type truck with any length wheelbase. They both bolt directly to the engine flywheel housing.

Heat Exchangers Desirable

Where considerable torque converter braking is anticipated, heat exchangers are particularly desirable to dissipate the heat from the converter. The total weight of the cooler and converter is still less than that of the various water-braking systems on the market. Since the engine throttle is closed during braking, little heat is rejected by the engine to the radiator. In fact, shutters are frequently used to maintain jacket temperature.

Pick Converter For Job

In summing up performance reports of Twin Disc converters being used in the mining industry, it has become evident that the answer to management's search for reduction of hauling costs is a torque converter engineered specifically for mining operations. With different mines facing different work cycle characteristics—some with short, steep runs; some with both steep grades and long, flat runs—the most efficient solution to each problem obviously points to selecting the converter designed expressly for the job.

Those seeking complete information and full performance data on either the Model CF or Model DF three-stage torque Converters, or on the new two-stage converters, are invited to circle Pep No. 80. Those requiring data for specific installations are urged to include complete details on each particular truck—namely: make; model; engine net horsepower and governed speed; and complete description of the driven equipment, duty cycle, etc., and altitude if truck is to be used at elevations over 1,000 feet.

Dart Model 140 truck—one of a fleet working in the Mesabi Iron Range—equipped with a Twin Disc model CF converter. Hauling 30-ton payloads up grades as steep as 16 percent, operators use the automatic converter drive and converter braking features to full advantage. Manual braking and shifting are virtually eliminated.

PRODUCTION EQUIPMENT PREVIEW

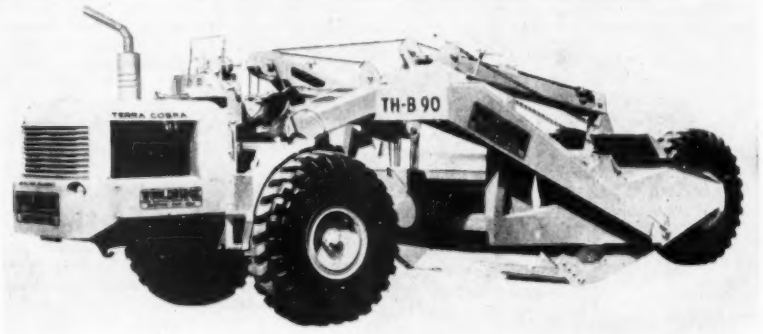
PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

New High-Speed Scrapers Announced by Wooldridge

Introduction of two new high-speed self propelled Wooldridge Terra Cobra scrapers, the TH-B90, with heaped capacity of 11.0 cu. yds. (8, 41 m³), and the TH-B110, with heaped capacity of 13.0 cu. yds. (9, 95 m³), has just been announced by Wooldridge Manufacturing Company of Sunnyvale, California. The standard 142 series has a heaped capacity of 17.5 cu. yds. (13, 4 m³).

Both new rubber tired models are said to incorporate the same basic design and operating characteristics as the larger machines, including positive hydraulic steering, air operated power control, "boiling bowl" loading, positive roll-out ejector and heavy duty construction throughout, with many components interchangeable with the larger models. The new units were developed to offer a complete range of capacities to meet varied earth-moving requirements, according to the manufacturer.

Model TH-B90 is equipped with a 150 hp Cummins Diesel engine, and has capacities of 9.0 cu. yds. (6, 89 m³) struck, 11.0 cu. yds. (8, 41 m³) heaped. The TH-B110 utilizes a 180 hp Cummins Diesel, and is rated at 11.0 cu. yds. (8, 41 m³) struck, 13.0 cu. yds. (9, 95 m³) heaped. All 142 series models are powered by 225 hp Cummins Diesels, and are rated at 14.0 cu. yds. (10, 7 m³) struck, 17.5 cu. yds. (13, 4 m³) heaped. Extremely high ground clearance, short turning radius, and ample flotation and traction are said to give the new units a high degree of maneuverability. For further information circle No. 48.



Pioneer Develops New 42 x 48 Jaw Crusher

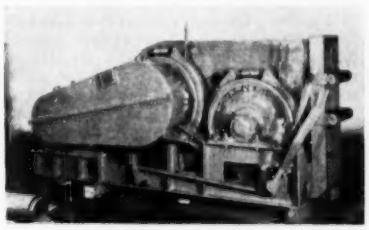
Consummating nearly five years of research and development engineering, Pioneer Engineering Works, Inc., of Minneapolis has just announced the addition of an extra large 42 x 48" size overhead eccentric jaw crusher to its line of crushing machinery.

The first unit, shown being loaded in accompanying photograph, has a crushing chamber exceeding four cu. yds. Weighing over 94,000 pounds, the machine incorporates manganese jaws, both moving and fixed, which are of two-piece construction to facilitate handling and are specially designed to reduce wedging resulting from cold flow and peening of the metal. Adjustments permit an opening at the bottom of the jaws from 4" to 13", which increases utility for large installations requiring high tonnages from extra large feed. For further information write Pioneer Engineering Works, 1515 Central Ave., Minneapolis, 13, Minn., or circle PEP No. 45.

Vulcan Tandem Slusher Offers Advanced Design

Vulcan-Denver has modified its 150 H.P. tandem slusher design to meet extremely rigid operating and maintenance requirements.

The 20,000 lb. rope pull slusher pictured features completely replaceable clutch members. The drum wearing surfaces and clutch bands can be changed quickly and easily underground to produce a completely new clutch on each drum. This is in contrast with other designs which require complete dismantling of the drum



assemblies to replace the clutch drum surface.

There are only two heavy duty rope rollers provided with the thought that ordinary wear is not the big problem with slusher rope. In place of rollers, on the sides and tops of the rope openings, are replaceable manganese steel shoes. For complete information circle No. 44.

Lectromelt Gets Franchise For Swedish Furnace

The Pittsburgh Lectromelt Furnace Corporation has been exclusively licensed in the U. S. to produce electric induction furnaces developed by Allmanna Svenska Electriska Aktiebolaget (ASEA) of Vasteras, Sweden, according to announcement by William Wallis, Lectromelt's president.

The licensing makes Lectromelt the second manufacturer of this type of melting furnaces in America. The Pittsburgh company for many years has been a leader in production of electric equipment for melting metals and the addition to its line is in keeping with the firm's policy of offering a complete line of such apparatus, according to Wallis.

As successfully developed by Sweden's ASEA since 1926, its high frequency induction furnace is essentially a thin walled crucible surrounded by a specially designed coil of water-cooled copper tubing. After the crucible has been charged with melting stock—a large furnace unit will melt a 12-ton heat at five tons an hour—an alternating current of controlled frequency and intensity is sent through the coil. An induced magnetic field then penetrates into the charge and rapidly heats and melts it.

Power for the furnace is supplied by a high frequency generator which varies in size depending upon the holding capacity and melting rate of the furnace. Lectromelt is cataloging the induction furnaces in 11 sizes with nominal charge capacities from 500 pounds to 15 tons. Information on the ASEA furnace can be obtained by circling No. 43.

LIGHTWEIGHT HARDHATS: Bullard Aluminum hard hats meet full industry requirements and federal specifications for safety equipment and are the lightest weight head protection yet devised. Circle no. 51.

CUT TIMBERING COSTS IN HALF: The Osmose process for treating timbers, available through the Dan Kamphausen Co. of Denver and affiliates in Oregon and Washington, offers a two-way service which greatly reduces the cost of timbering and cross-ties in any mining operation. The suppliers will furnish any mine with Osmosalts or Osmoplastic for treating your own timber, or will provide all types of Osmose Treated mine timbers direct from their own mills at economical cost ready for use. For further information circle no. 52.

BETTER GRINDING WITH LESS UPKEEP: Traylor mills are built with new Meehanite bearings to overcome the wear problems caused by excessive starting torque. For full information on the advantages and uses of Traylor ball, rod, and compartment mills, get Traylor bulletin 7121 by writing Traylor Engineering & Mfg. Co., 533 Mill St., Allentown, Pa. or by circling no. 50.

PROTECTED PIT POWER: Westinghouse has published a book that covers the proper use, installation and protection of electric power in open-pit mines from source to ultimate load. Ratings of transformers, shovel performance, power factor correction, and distribution-system layouts for different types of mines are covered in the first part of the book. The second part is devoted to various systems of ground protection, what equipment is necessary in well-designed distribution systems, and where this equipment should be located. no. 53.

BETTER BEARING SERVICE: Mechanical stability, resistance to breakdown, and longer service life have given Shell Oil's lithium grease wide applications wherever bearing lubrication is required. To get more information on how multi-purpose lithium grease has replaced over 20 standard products, circle no. 54.

GAS TURBINES: "The Combustion Gas Turbine and Its Application" is the title of a new release by General Electric. It discusses the theory and uses to which turbines have been put as well as possible uses for future models. Power generators, locomotives, and pipeline pumping are some of the successful present installations. For a copy, circle no. 55.

Harvester Reduces Prices On R-Line Truck Models

A substantial reduction in the retail prices of its light, medium, and light-heavy duty R-line models of motor trucks, which it recently introduced, has just been announced by the International Harvester Company.

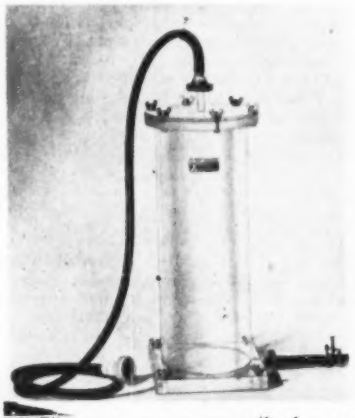
The price reductions cover the company's R-110, 120, 130, 150, 160, 170, and 180-model series, ranging from its smallest pickup trucks through those of the 19,500-pound rated capacity.

The downward price adjustments range from 3.5% on the R-180 series to 10.6% on the R-120 pickup models. They range from a minimum of $87 to a maximum of $152 on former list prices. The overall price reduction in these weight categories amounts to about 6.7 per cent.

Low-Cost Ion-Exchange Unit for Metal Recovery

Ion Exchange, until recently just a curiosity, is fast becoming an accepted method of recovering metals from low grade ores, of separating the rare earths (which are almost identical chemically), of decontaminating radioactive waters, and of deacidifying mine waters. Thanks to several newly developed resins, ion exchange is cheaper, faster and more convenient than ever before.

Many refiners who have until now been reluctant to install costly ion exchange equipment will be interested in the Enley



"PUP" reactor, a new, versatile, low-cost unit ($46.95 and up) which can be quickly hooked up for laboratory and pilot plant operation. Six sizes are available, the smallest having a capacity of 3 pounds of resin and a flow rate of 60 gallons per hour, and the largest having a 30 Lb capacity and a flow rate of 260-520 gallons per hour. Further information may be obtained by writing "PUP" Reactor Division, Enley Products Inc., 254 Pearl St., New York 38, N. Y., or by circling no. 49.

Mining Progress Pictured In Gardner-Denver Film

How does the modern prospector find uranium with his Geiger counter? And how does his search compare with that of the old time gold prospector?

That's one of the interesting contrasts between old and new mining methods shown in a colorful educational movie just released by Gardner-Denver Company.

PAY DIRT, as the new mining film is called, dramatizes the improved techniques which mining men and mining equipment manufacturers have developed for producing greater and greater tonnages of iron, copper, uranium, zinc, nickel, lead, and all the other minerals which are used so abundantly today.

It shows, for example, the strenuous hand drilling methods practiced years ago, followed by scenes of miners using early compressed air powered rock drill models, and then the newest high speed automatic drilling equipment.

One sequence contrasts back-breaking hand shoveling with modern machines for loading ore into mine cars—another application of compressed air power that has made the miners' work easier and has helped mine managers increase production per man-hour.

PAY DIRT is a 16-mm. sound, color film that runs for about 30 minutes. It is one of a number of films on construction and mining subjects which are available from the Gardner-Denver film library, at no cost. For information on obtaining film circle 77.

LeTourneau Purchased by Westinghouse Air Brake

Westinghouse Air Brake Company last month announced purchase of the earth-moving and related business of R. G. LeTourneau, Inc., including all fixed assets and machinery at Peoria, Illinois, Toccoa, Georgia, and its interest in the Australian subsidiary for approximately $19,500,000, Edward O. Boshell, President and Chairman of the Board of Westinghouse Air Brake, announced here today.

Westinghouse will also take over certain current assets of the LeTourneau company consisting principally of inventory at book value less reserve, at an estimated price of $6,000,000 to $8,000,000.

The new business will be operated as the LeTourneau-Westinghouse Company, a subsidiary of Westinghouse Air Brake. No change in personnel is contemplated, and all key executives will remain with the new Company.

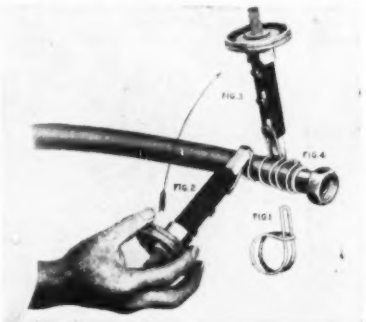
Mr. LeTourneau, who is a pioneer and recognized leader in the earth-moving equipment industry, will devote part of his time to LeTourneau-Westinghouse as a consultant on development and research work in this field.

R. G. LeTourneau, Inc. reported sales of $55,496,529 for 1952 compared with $55,842,710 in the preceding year. While not all of the properties will be purchased, a substantial portion of these sales were derived from the earth-moving business.

New Hose Band and Tool Cuts Connection Costs

If you use hoses in your plant, you can save money by using the new type Squire-Cogswell hose connection, comprised of a hose band and hose tool. No bench or vise is needed to apply the bands, and they may be attached anywhere. Savings in time and labor cost by this method amount to as much as 75% over the old method of applying couplings, according to Squire-Cogswell Co., the manufacturer.

The tools are made in two sizes to fit all size hoses: the Junior for bands up



to ¾" sizes; the Senior for bands 1" size and over. The bands are made of soft steel wire, electro galvanized and welded, and are also available in brass if required. They are available for hose from ¼" to 3" in diameter, and can be used equally well for air, steam, water or oil hoses. Circle No. 47.

NEW TANDEM SLUSHER CUTS COSTS: Minimum space requirements in smaller slusher drifts is just one of several economies being attributed to the new Vulcan-Denver line of tandem drum slusher hoists. The new units, ranging from 25 to 150-hp., provide major advances in ease of operational control and longer cable life. For complete information on this new line of high-capacity slushers, circle No. 1.

THIN LINERS BOOST PRODUCTION 35%: A new, light, thin (only one inch thick) alloy, ball mill liner was designed by Amsco to replace a heavy three inch thick one. Result: Increased mill capacity, heightened efficiency, long wear, lessened down time because segments were easier to install—a 35 percent increase in production. Information to this money-saving approach to your grinding problem may be had. Circle No. 2.

LOWEST COST POWER is sometimes found with gasoline industrial engines says Chrysler who has adapted production-line methods to specialized engine building to give customers a custom-built engine at mass-production prices. Chrysler can equip its engines, up to 180-hp. to meet special requirements. Available, for example, are propane or natural gas burning carburetor, gyrol Fluid Coupling or torque converter. For information circle No. 3.

HANG VENTILATING TUBE ON NAIL: Bemis Brothers Flexible ventilating tubing is now available with Rope Seam Suspension at no additional cost. Newest, quickest suspension eliminates special accessories and suspension wires. Available in variety of lengths and diameters. For complete information and sample circle No. 4.

SCREEN BLINDING PROBLEMS? The wedge shape of the wire with its non-clogging, non-blinding features enables Kleenslot preparation screens to solve many nasty wet and dry screening problems. Your present machines will accomodate Kleenslot. For illustrated literature circle No. 5.

BIGGER ORE TRUCKS: The world's largest truck—60 ton pay load capacity—is now hauling copper ore. This twin-engined, rear-dump unit has twelve wheels, torque converters, power steering and is claimed to be as maneuverable as most smaller trucks. If bigger pay loads could reduce your mining costs, Dart Truck Company would like to tell you about their Model 60. Circle No. 6.

PACKAGED DIESEL POWER UNITS: A complete, compact Nordberg diesel engine (type 4FS) with radiator, fuel tank, fuel and lube oil filters, air cleaners and starting systems are offered in one to three cylinder sizes—10 to 45-hp. They are available as straight power units, generator sets producing from 6 to 30 K.W. or as centrifugal pumping units. For information circle No. 7.

HOT MATERIAL CONVEYOR: Seven good reasons are claimed by Chain Belt Company why their Rex Pan Conveyor may be the proper answer to your hot material handling problem. Chain and rollers removed from intense heat zone, suitable for carrying up 25 degree angles, low power requirements, ease of servicing and lubrication and longer chain life are among the reasons. For information circle No. 8.

JAW CRUSHER BULLETIN: The results of fifty years of crusher building experience are embodied in the present line of new bulletin describing the complete line Rogers Iron Works jaw crushers, and a has just been published. Circle No. 9.

THERE'S NO TAIL SWING: and that's an important item if you want to dig in close quarters right up against a wall, bank or other obstruction according to the Hyster Company. With Hystaway you can work in places where digging is impossible with shovels which must have room to accommodate a swinging superstructure. Bulletin 1235 describes this versatile, Caterpillar mounted, machine which mounts dragline, shovel, backhoe, clamshell, crane and pile driver—plus bulldozer. Circle No. 10.

UNIT-SEALED, PRE - LUBRICATED IDLERS: Construction that permits from one to three years of operation with relubrication is claimed by Continental Gin Company for its "UST" conveyor idlers. For bulletin describing the grease, labor and belt saving features of this idler, circle No. 11.

PILOT-PLANT DRYERS AND ROASTERS: Nichols Engineering has issued a bulletin describing its complete line of drying, roasting and sintering laboratory equipment. Also described are the company's laboratory and testing services. For copy circle No. 12.

WOOD LINED STEEL PIPE: Claimed to be ideally suited for acid mine waters, slime, sludge and slurries is Michigan Pipe Company's wood lined steel pipe. Made in diameters from 4-inches through 48" lined with clear redwood, Douglas fir, pine or maple staves and with pressure ratings up to 400 psi, the pipe and fittings are available in stock sizes or fabricated to special order. For information circle No. 13.

RECOVER LOST BITS AND BROKEN RODS: A Dings pocket-sized magnetic drill extractor is a low-cost item that can save time and money in recovering expensive drill bits that become detached in the hole. For information circle No. 14.

WIRE BRAIDED HOSE: Wiretex, an industrial hose that is continuously reinforced with multiple braids of wire, that is claimed by its manufacturer, Republic Rubber Division of Lee Tire and Rubber Corporation, to have all of the desirable characteristics of high quality rubber hose. In addition it is not weakened by flexing and bending, it resists temperature variance between 40 degrees and 200 degrees and will maintain diameter dimensions despite high pressure surges from 400 to 5,500 psi. It is oil, grease and abrasion resistant and won't rust or corrode. For information circle No. 15.

ROTARY AIR COMPRESSORS: The Fuller Company suggests that their rotary compressors have many advantages that warrant examination. Among these are no reciprocating parts, no valves to leak or seats to grind and no unbalanced forces to set up vibration. For information circle No. 16.

LONGER WEAR WITH FLEXIBLE VALVE: The diaphram motor-operated Farris Flex Valve is built for long life in lines carrying semi-solid slurry. It is claimed that it will outwear any metal valve in abrasive service, give full pipe capacity, will not freeze up, etc. For their catalog No. FL 382 D, circle No. 17.

SUPER TOUGH SAFETY HAT: The new Willson safety hat is entirely new in design, material and method of manufacture. It is streamlined, has new type of suspension, built to provide cooling air circulation and is moisture resistant. For bulletin describing the Willson super-Tough Safety Hat, circle No. 18.

COUPLINGS FOR GROOVED PIPE: Gruvagrip, product of Gustin-Bacon, for quick application and quick removal; designed for water lines, waste lines and other pipes requiring frequent moving. They are flexible and automatically allow for expansion, contraction, end pull, shock and vibration. For data, circle No. 19.

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ION EXCHANGE PROCESSES: Among the data developed by Permutit Company on the subject of metal recovery by ion exchange methods is a technical bulletin outlining the recovery of metals from dilute processing solutions containing metals as well as precious metal recovery by ion exchange. For your copy circle No. 20.

TWO-YARD FRONT END LOADER: The first tractor mounted shovel of two-yard capacity is now available from Caterpillar Tractor Company. Mounted on a 66-drawbar horsepower crawler, the shovel will be actuated hydraulically. Dumping height is 10-ft. 9-in.; reach, 3-ft. 5-in. For information on the No. 6 shovel circle No. 21.

DRAGLINE WITH NEW TYPE DRIVES: Not the largest dragline built, but the largest ever mounted on a single set of crawler frames is Harnischfeger's Model 1855. Designed to handle up to 10 cu. yd. shovel dipper or dragline bucket, depending upon application, power for all digging functions—swing, hoist, crowd and travel—is through magnetorque drives. For Bulletin circle No. 22.

ONE BEST WIRE ROPE. A sixteen page booklet incorporating the latest information on the "one best wire rope" to use with each type of mining equipment has been prepared by the Hazard Wire Rope Division, American Chain and Cable Company. For DH-129A, circle No. 23.

PERMANENT MAGNETIC DRUM SEPARATOR: A magnetic drum separator with permanent magnets is described by Eriez Manufacturing Company, in a six-page booklet. For their bulletin No. B-601, circle No. 24.

DIESEL ENGINE BOOKLET: A handy 28-page primer entitled "What You Should Know About Diesel Engines" that discusses their operation has been made available by Harnischfeger Corporation. For yours, circle No. 25.

SAFETY FEATURE IN MINING CABLE: An electric cable for portable mining machinery that reduces chance of shock and arcing has been announced by Anaconda Wire and Cable. It is made so that power is cut off the moment the positive conductor insulation is damaged. For information, circle No. 26.

NEOPRENE PUMP IMPELLER: "Jabasco" pump, the pump for corrosion service, is described in American Hard Rubber Company's data sheet 97A. For copy, circle No. 27.

CONTROLLED SLUSHING: Gardner-Denver's airslushers feature speed and power with finger-tip control for high speed mining at reduced cost. For a copy of the G-D airslusher bulletin, circle no. 28.

DIAMOND BITS FROM EXPERIENCE: Sprague and Henwood builds diamond drill bits on the basis of the field experience of its own drilling crews—over sixty years of operating experience is behind every Sprague and Henwood bit. For further information, circle no. 29.

HIGH PAYLOADS WITH NEW SKIPS: Lake Shore engineered mining machinery like the aluminum and steel Jeto bottom dump skip mean higher payloads and production increases. To get a copy of Lake Shore's complete catalog 450-A, circle no. 30.

INSERT ROCK BITS: With rotary drilling now being applied to hard rock, Kennametal has expanded its line of insert bits to include rotary and chopping bits for higher production, lower costs, and better and faster sampling. Detailed information is available by circling no. 31.

PUMPING FACTS: Laboratory-based claims by the Johnston Pump Company have been conclusively proved by world-wide in-the-mine pump installations throughout the world where Johnston pumps are handling pressures up to 600 psi at temperatures as high as 250°F. If you have pumping problems, enlist Johnston's aid by circling no. 32.

MINE COMMUNICATIONS: Mine Safety Appliance Company has two mine phone systems specifically designed to increase the efficiency and production in underground operations. Whether it's hoisting or tramming that needs better coordination, MSA equipment can supply the answer. For full details, circle no. 33.

FILTER FABRICS: Whether it's fumes, dust, or liquids, Fumeall filter fabrics are tailored to give superior service. The best features of virgin wool and Dynel are combined in Fumeall. Circle no. 34.

ONE MAN SCRAPER EXCAVATORS: Sauerman earthmovers feature one-man control in digging, hauling, and automatic dumping and are available as drag scrapers, slackline cableways, mobile towers, or boom scrapers. To get catalogs A, C, E, and G, circle no. 35.

HEAVY DUTY ROTARY DRILL: With production records up to 90 feet per hour through hard blue shale and sand rock, Salem Tool Company's McCarthy drills have proved to be money-savers in blast hole drilling. They're available with gasoline, diesel, or electric power on a variety of mounts. Circle no. 36.

LIGHT WEIGHT PIPE FOLDER: As a quick resumé of lightweight pipe uses, Naylor Pipe Company has published a folder showing where such pipe can be used to best advantage in your field. For your copy of bulletin no. 507, circle no. 37.

LABORATORY FACILITIES: Stearns Magnetic Inc. has complete laboratory and testing facilities for testing your ore for magnetic separation methods. To get more complete information on this service, circle no. 39.

DIESEL POWERED EARTHMOVERS: A new catalog has been published giving the complete design and engineering specifications on General Motors Diesel-powered Euclid trucks, haul units and scrapers. For your copy of this 20-page booklet, circle no. 40.

NEW ROPE LUBE: A new series of highly adhesive lubricants for cables and open gears has been announced by E. F. Houghton and Company. One of the outstanding features of these new Tenac lubes is the ease of application—no preheating is necessary. For a copy of data sheet describing Tenac, circle no. 41.

SPIRAL BITS AND STEELS: Where cuttings are hard to remove from percussion drill holes, use Lane spirial bits and extension rods for better and faster hole production. For further information on these remarkable new aids to better drilling, circle no. 42.

BETTER CONVEYOR BELTING: Boston Woven Hose and Rubber Company is developing a new conveyor belting with a rayon base that has shown by present field tests to have superior troughing, low-stretch, and mildew resistance. Circle no. 38.

AUTOMATIC TITRATION FOR MOISTURE: Latest information on the new Beckman Aquameter, a high-speed electronic device which titrates for moisture automatically, has been compiled in an illustrated 4-page brochure for general release. The unit enables an untrained technician to run precise water analyses in one or two minutes. Circle No. 46.

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precipitates—CENTRAL and EASTERN

Eagle Picher Closes Four Zinc Mines in Tri-State

The Eagle Picher Company is closing four of its mines in the Picher, Oklahoma area because of the steady decline in the price of zinc. These mines produce about 20 percent of Eagle Picher's zinc and lead concentrates in the Tri-State district.

Another important factor for the closing of the mines, according to Elmer Isern, vice president, is the decline in the grade of ore mined. In 1939 it amounted to about 6.50 percent lead-zinc sulphide; this has now dropped to about 2.50 percent.

DMPA and National Lead Sign Research Contract

A research project to determine the feasibility of using domestic brookite (TiO_2) in the production of welding rod coating and titanium metal will be undertaken by the National Lead Company who has just signed a contract with the Defense Materials Procurement Agency for this work. Ore for the tests will come from a contact deposit located near Magnet Cove in Hot Spring County, Arkansas.

About 50 tons of ore will be mined by the company from different parts of the deposit. It will be crushed at the site and then shipped to the Colorado School of Mines Research Foundation at Golden, Colorado, where it will be concentrated. The ore is expected to yield from 2,500 to 3,000 pounds of high-quality brookite concentrate.

About 1,000 pounds of concentrate will be sent to National Lead's plant at Niagara Falls, New York where it will be ground into welding rod coating for testing by two different welding rod manufacturers. Another 1,000 pounds will go to National Lead's laboratories at Sayreville, New Jesey for use in test production of titanium tetrach'oride. About 500 pounds will be turned over to the U. S. Bureau of Mines for use in research at the Bureau's laboratories at Rolla, Missouri where the Bureau has already conducted extensive tests with brookite.

DMPA will reimburse the company for up to $20,000 of its direct expenses occurred in the project.

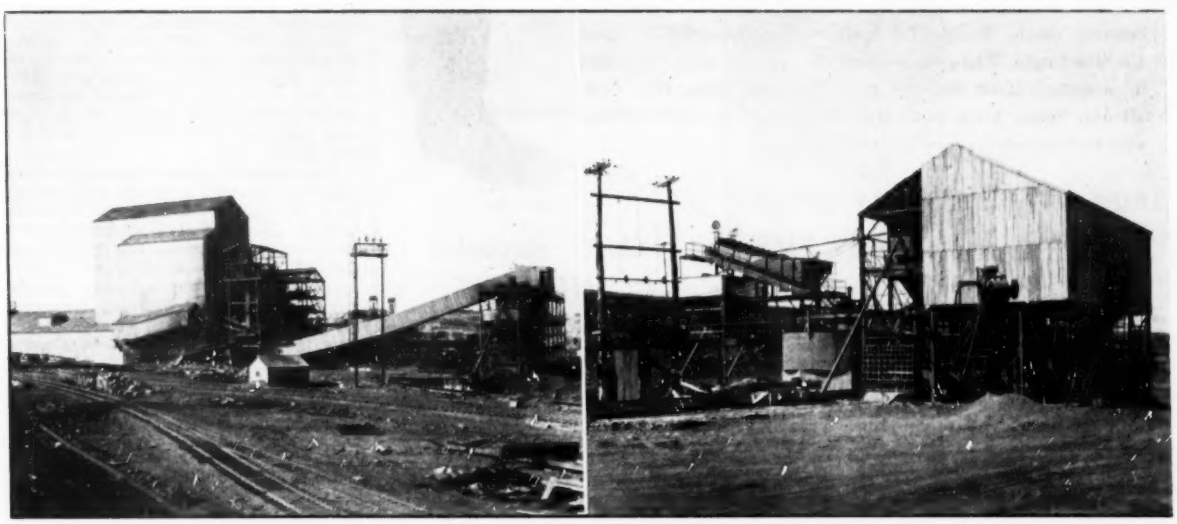
The *U. S. Atomic Energy Commission* has announced the opening of a new office at Ishpeming, Michigan, to stimulate interest in exploration of uranium deposits in northern Michigan, Wisconsin, and Minnesota. L. P. Barrett will be director of this office.

The incline project at No. 2 National Shaft of *St. Joseph Lead Company* has been completed and is in operation. It will handle supplies for 20 mine groups and two general mines. Most supplies and heavy machinery can now be lowered into the mines on incline cars from trucks or regular railroad cars. Previously, heavy machinery was dismantled and then rebuilt after being lowered into the mines. The incline is on about a 40 percent grade from the bottom level of old No. 2 shaft to the surface. At the company's *No. 1* mine, Bonne Terre, Missouri, operations will be closed down for a short time during the summer while the wooden headframe is replaced by a steel structure.

The Industrial Minerals Division of the *International Minerals & Chemical Corporation* is constructing a new refractory specialties plant at Janesville, Wisconsin, which will have a capacity of 75,000 tons a year. Chief product of the new plant will be a granular refractory for air application in the patching of metal melting furnaces.

During the month of February, the Tri-State district produced 414,197 short tons of crude ore, with a recovery of 2.98 percent zinc and 0.61 percent for lead, with a production of 12,336 tons of zinc concentrates and 2,543 tons of lead concentrates at a combined value of $1,347,450.

Recently incorporated in the state of Arkansas is the *Arkansas Mining and Exploration Corporation* of Batesville. In-



CCI'S HAWKINS MINE—MODERN BENEFICIATION PLANTS

One of the most complete large-capacity beneficiation plants on the Mesabi Range is that of the Cleveland-Cliffs Iron Company at its Hawkins mine at Nashwauk, Minnesota. Construction of the crushing, screening, washing, and first section of the HMS plant were completed last year. (See photograph left above.) Under construction at the near end of the building is a 160-ton-long-tons-per-hour Dutch State Mines HMS cyclone plant. This plant is scheduled for operation during the 1953 season. In the photograph at the right is the 80-long-tons-per-hour Humphreys spiral and hydrosizer plant which was put into operation during the latter part of last season. This plant, also at the Hawkins mine, treats material from an old tailing pond. Feed is pumped to the plant by a portable screening and pumping unit.

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MINERS' PACS

High quality black rubber lace pacs, in three styles: ML-968, 16" high; ML-760, 15" high; ML-179, 10" high. Cushion insole. "Toe-Saver" Safety Toe. Also non-lace "Terra Haute" pacs. Style ML-271.

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corporators include J. H. Martin of Little Rock, May Bell Reiter of North Little Rock, John Mothershead of Crystal City, Missouri, and Herman Miller of Batesville.

A special boiler is being designed and built by *Babcock & Wilcox Company* for the White Pine copper smelter 18 miles southwest of Ontonagon, Michigan. The boiler will use what would otherwise be waste heat from a copper reverberatory furnace to supply steam to a turbo-generator which in turn will supply power for the project. The *White Pine Copper Company*, a wholly owned subsidiary of *Copper Range Company*, is undertaking the $57,000,000 project which is expected to produce 36,000 tons of copper annually when in full production by the end of 1954.

The *U.S. Bureau of Mines* is continuing its investigation to recover columbite-tantalite concentrate as a byproduct of domestic mining operations. The spodumene belt at Kings Mountain, North Carolina and the titanium-minerals deposit at Magnet Cove, Arkansas, show particular promise of production. Initial results of a recent study indicate the possibility of commercially recovering pure columbium and tantalum from tin slag.

Kennametal, Inc., of Latrobe, Pennsylvania is the fourth agent to be designated by the *Defense Materals Procurement Agency* as a purchasing agent for columbium-tantalum ores and concentrates. The purchase program, designed to stimulate production, provides for a bonus payment to the producer of the ore or concentrates. The program runs until December 31, 1956 or until 15,000,000 pounds of the combined columbium-tantalum pentoxide has been purchased. Other agents are the *Fansteel Metallurgical Corporation* of North Chicago, Illinois; *Wah Chang Corporation* of Glen Cove, New York; and the Emergency Procurement Service of the General Services Administration in Washington, D.C.

The *Burns-Spangler Construction Company* has received a $6,700 DMEA contract to explore for mica in Cleveland County, North Carolina. The government's participation in this project will amount to $6,030.

After 18 months of inactivity, the aluminum stockpiling program has been revived for the second quarter of this year. The General Services Administration will purchase the aluminum for the stockpile.

The government-owned magnesium plants at Painesville, Ohio, operated by *Diamond Magnesium Corporation*, and at Canaan, Connecticut and Wingdale, New York, operated by the *Nelco Metals, Inc.*, will be closed. A review of current and future requirements brought this recommendation from the Munitions Board, and the General Services Administration has ordered the cutback.

A certificate of necessity permitting rapid tax write-off of 90 percent of $25,740,500 worth of titanium sponge production facilities has been awarded to *Cramet, Inc.*, of Nashville, Tennessee. Two similar certificates have been

granted to *Jones & Laughlin Steel Corporation* of Pittsburgh, Pennsylvania for iron ore facilities worth $5,213,800.

The *Utah Construction Company* is engaged in sinking a shaft as part of mine expansion program at the *Hamme* tungsten mine of the *Tungsten Mining Corporation* in Vance County, North Carolina. The shaft has reached the 1,100 foot level, a station has been cut, and development work of the new level is proceeding.

As a result of the continued low price of slab zinc, the *American Zinc Company of Tennessee* has discontinued all operations at the *Jarnagin* mine in Jefferson County, Tennessee. Development of the *North Friends Station* property is continuing at a satisfactory rate. It is not expected to go into production for another eight to 12 months.

Swift & Company has opened new general offices in Agricola, Florida, where the firm has been mining phosphate since 1906. The new headquarters building also houses an analytical and research laboratory.

The *American Zinc Company of Tennessee* rehabilitated and placed in operation its Strawberry Plains Quarry last year when the demand for mine byproducts such as stone, sand, and agricultural limestone became exceedingly good. During the year, the firm also continued active prospecting by churn and diamond drilling. This resulted in the addition of about 6,200,000 tons of ore containing 300,000 tons of 60 percent recoverable zinc concentrates to the Tennessee reserves. Preliminary plans for sinking shafts and bringing the South Friends Station ore body into production are practically complete and the first shaft should be sunk sometime during the second quarter of 1953.

The Munitions Board of the Defense Department has agreed to buy "non-ruby" mica. "Non-ruby" is a new term in the mica trade. It has been used in the operation of the government's mica buying depot in Spruce Pine, North Carolina to include both green and clear mica. While no prices have been announced yet, the new program is expected to reactivate many green and clear mica producing mines in Avery and Yancey counties of North Carolina.

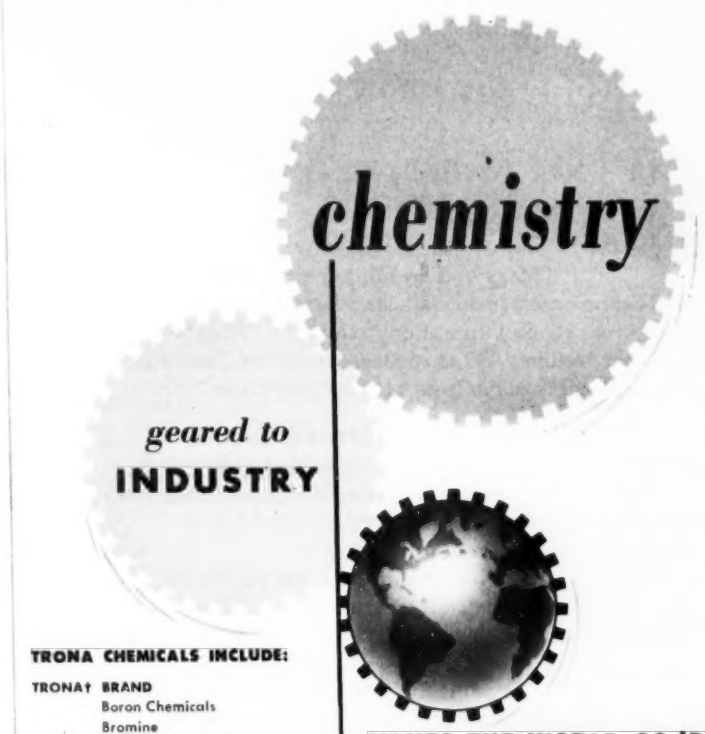
Special belt conveyors have been installed at the Port of Mobile, Alabama, for the *Reynolds Metal Company* to handle unloading of bauxite from a new type of self-unloading ore carrier to railroad. The Rust Engineering Company of Birmingham and Pittsburgh did the work.

Laboratory tests by the U. S. Bureau of Mines show that zinc, copper, and lead can be recovered by beneficiation from the massive pyrrhotite ore of the Great Gossan Lead—a mineralized structure extending 17 miles across Carroll County, Virginia. A major obstacle in beneficiating by ore dressing methods had been the difficulty of obtaining strictly comparative tests due to rapid oxidation of the ores. The Bureau found that calcined concentrates leached with dilute sulfuric acid solutions and ferric chloride-brine solutions yielded 85 percent of the total zinc, 85 to 89 percent of the total copper, and 95 percent of the total lead.

American Zinc Company of Tennessee produced 27,386 tons of combined zinc-lead concentrates from the Picher, Oklahoma properties during 1952. This property had been acquired from the *Nellie B. Mining Company* in 1951. In a joint venture with *Brown and Root, Inc.*, the development of the *Quick Seven* open-pit zinc-lead mine and construction and installation of milling facilities were completed during the year. The property at Neck City, Missouri was placed in operation during the latter part of 1952. Grade of ore mined thus far is below the average of the reserves.

The large Pennsylvania Railroad ore dock at Buffalo, New York, may become idle this year after steady operation for the past 10 or 15 years. *Bethlehem Steel Company*, which has used the dock for storage of ore for its Lackawanna plant, has expanded storage facilities on its own property in Lackawanna and has no further use for the dock. The Pennsylvania Railroad, owner of the dock, is seeking a buyer or leasee.

The *Davison Chemical Corporation's* $12,410,000 triple superphosphate plant now under construction at Ridgewood, Florida, is expected to go into operation early in 1954. The plant will have an annual capacity of 200,000 tons.



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IRON RANGES

Oliver Iron Mining Division of the *United States Steel Corporation* has started construction of a crushing and screening plant at the *Morris* mine extension on the outskirts of Hibbing, Minnesota. This plant will handle possibly 300 long tons per hour. Part of the production will be shipped to the new wash plant at the *Hull Rust* mine for further beneficiation.

Representatives of the *Jones & Laughlin Steel Corporation* of Pittsburgh, Pennsylvania are reported to have met with officials of Iron County, Wisconsin to consider the possibility of purchasing or leasing county land for development of a low-grade iron ore deposit. The area in which the firm is interested is on both sides of U.S. Highway 51, around Pine Lake. The county-owned land is included in the area located from a short distance west of the highway to a point east of Long Lake that was explored many years ago by *Kissinger Mining Company.*

Work completed to date at the *Fortune Lake* property of *Pickands Mather & Co.* near Crystal Falls, Michigan includes the construction of a temporary headframe, engine house, transformer station, and office. Underground work to date consists of re-timbering 275 feet of the old shaft, and shaft-sinking to the 305-foot level. At this level a total of 870 feet of 8- by 9-foot drainage drift has been driven. The unique feature of this drift is that it will be used to dewater the open pit. Approximately 850,000 cubic yards of overburden has been removed. Other work completed on the mine surface includes the excavation for the relocation of the Chicago Milwaukee St. Paul Pacific Railroad tracks. The relocation of the Iron County road approaching the property from U.S. Highway No. 2, and the excavation and fill for mine railroad tracks are in progress. First production of iron ore is planned for August.

The first load of low-grade copper ore has been brought to the surface at the *White Pine* mine of the *White Pine Copper Company*, near Ontonagon, Michigan. About 800,000 tons will be stockpiled before completion of the new mill and smelter late in 1954. White Pine, a subsidiary of *Copper Range Company*, has a $57,185,000 loan from the Reconstruction Finance Corporation to develop the property. When in full production by the end of 1954, 36,000 tons of copper is to be produced annually.

Shipments of ore from the properties of *Oliver Iron Mining Division, U. S. Steel Corporation*, in 1953 are planned for 48,000,000 tons, an increase of 2,000,000 tons over the record set in 1951. To speed up ore production from the *Gross-Marble* pit, a larger belt is being installed. The Gross-Marble concentrator area acquired has been changed, with a new truck pocket constructed adjacent to the present conveyor belt system. A big job was completed at the *Spruce* mine at Eveleth, prior to the start of shipping. The loading pocket was lowered for the third and final time. A 1,540-foot underground belt will take the ore out of the pit on a 25 percent grade.

precipitates—NORTHWEST

Electric Point Lead Mine Reopened in Washington

The old Electric Point mine in northern Stevens County, Washington, a famous high-grade lead producer, is being reopened by the State Mining Company who has the property under lease and option. Harris & Bumgarner, Northport mining contractors, are doing the work for State Mining.

The old Yoder shaft has been rehabilitated to a depth of 70 feet and exploratory drifts extended from the shaft. A 70-foot shaft has also been sunk alongside No. 5 ore chimney, and a 400-foot drift driven from the bottom. An air compressor and Diesel-electric plant have been installed, and a 60-hp. electric hoist has been purchased. The hoist will be set at the end of the rehabilitated 1,000-foot No. 3 level adit and used in cleaning out and retimbering the 800-foot main shaft. First new exploration is planned for the 500-foot level to develop ore chimneys untapped by previous operators. Rehabilitation work and preliminary exploration have yielded 7½ tons of shipping ore assaying 73.4 percent lead and three ounces of silver per ton.

The Electric Point mine was discovered in 1914 by J. E. Yoder and Chris Johnson. A company was formed which operated regularly from 1916 to 1920, producing 100 tons of shipping ore daily. It was shut down in 1921 with lead at 4½¢ per pound, to await a more favorable market. Over the years it has been leased to many operators.

Hanna Signs Nickel Mining Lease in Oregon

Hanna Development Company has signed a contract with Douglas County, Oregon, for the leasing of 160 acres of county land and payment of royalties on the nickel ore removed. The leased area is on Nickel Mountain where Hanna is currently developing an open-pit mine.

The contract provides for payment of a $500 minimum royalty and 25¢ per ton for each ton of nickel ore removed for treatment at the company's smelter. An additional five percent royalty will be paid on all minerals other than nickel. Tonnage is estimated on dry weight as it is delivered to the recovery plant. Half of the $500 minimum royalty will be applied toward reduction of royalty payments on ore mined and shipped by the development company. The county has retained the right to tailing at the mine site, probably to be used in road construction.

A second contract with the county provides for rental of 80 acres of county land lying between the orebody and the smelter site for a right-of-way. The land-use lease will run for 10 years with option held by the company to renew the lease for five-year periods for the next 50 years. Provision has also been made for another lease in the event that a merchantable orebody is found on the land-use lease.

Sun Valley Lead-Silver Mines has resumed mining at its *Blue Kitten* mine in The Warm Springs district near Ketchum, Idaho and is stock-piling development ore. Ross L. Roundy is president and manager.

Idaho Goldfields, Inc. has reopened its mine camp near the summit of Fourth of July canyon, east of Coeur d'Alene, Idaho, and is planning deeper diamond drilling and geophysical work. W. M. Fredericks of Spokane, Washington, is president.

A $245,200 development program is planned by *Idaho Custer Mines, Inc.*, at its *Livingston* property in Custer County, Idaho. Work would include deepening the shaft 550 feet to develop downward extensions of ore bodies. The firm has applied for a DMEA loan. It has organized a new firm, *ICM Finance Corporation*, to sell interest-bearing notes, secured by a chattel mortgage and repayable from 75 percent of net profits. C. Paul Grosenick of Seattle is president.

Settling ponds constructed by two Southern Idaho gold dredging firms to comply with an Idaho state law effective May 5 are inadequate to prevent stream muddying, according to Idaho mine inspector George McDowell. Chemicals will have to be used, he added. Mr. McCowell and Public Health Engineer Aleck Alexander plan to set up machinery for feeding lime into Big Creek near the north fork of Payette River where dredging of monazite sands is under way. *Baumhoff-Marshall Dredging Company* was running dredge water through a mile and a half of settling ponds and gravel. Idaho-Canadian Dredging Company's ponds were smaller but contained more sand.

The fluorspar mill at Meyers Cove, Idaho near Challis, has been destroyed by fire. Loss was estimated at $200,000, partly covered by insurance. *J. R. Simplot Company* which operates the mine and mill has not released any plans for rethat the firm may delay construction for another year while some diamond drilling is conducted to be certain that reconstruction of the mill is worthwhile. The plant had been treating about 100 tons of fluorspar ore daily.

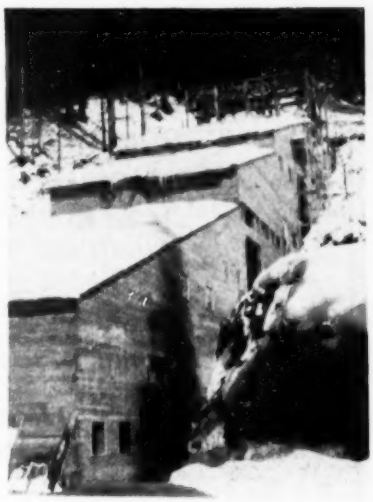
The *Bunker Hill & Sullivan Mining & Concentrating Company* has been awarded a DMEA contract amounting to $1,098,750 to explore for lead-zinc-copper in Shoshone County, Idaho. The government's share will be $549,375.

Stockholders of American Smelting and Refining Company approved the merger of *Federal Mining and Smelting Company* into ASARCO. Under terms of the agreement, stockholders of Federal will receive 1⅔ shares of common stock of ASARCO for each share of Federal.

A Diesel locomotive used in the 9,200-foot haulage tunnel at the *Atlas Mining Company's* deep development project near Mullan, Idaho, has now successfully been operated for more than 2,500 hours, or more than 140,000 ton-miles. The Atlas three-compartment shaft, down about 2,400 feet, was advanced at an average rate of 8.1 feet daily in the last half of April. A benching system and Riddell clamshell mucker have been used. Deepening of the old 840-foot shaft to the

SCHEELITE FROM MILL TAILING

Kromona Mines Corporation of Seattle, Washington, is adding jigs and tables to its 100-ton flotation plant in order to recover scheelite from mill tailing. The Kromona mine, which is about 19 miles northeast of Sultan, Washington, has been a regular producer of copper-gold-silver ore and it is tailing from this production which will be rerun in the revamped mill. Workmen are installing a 1000-foot mine-to-mill tram purchased from Riblet Tramway Company of Spokane. Development work costing $112,336 was done in 1952. Good copper-gold-silver ore was drifted on and investigation showed commercial scheelite disseminated through the vein structure. A headframe and loading ore bins were constructed at the tunnel level. A new 35 by 50-foot tunnel shed at the portal will house a dry and a compressor house. Joe F. Krom of Seattle is president and general manager.



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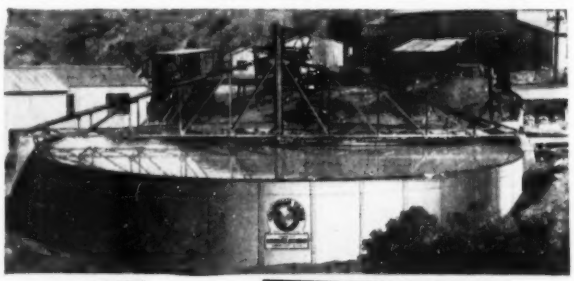

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2,400-foot horizon began late in June 1952. Well ahead of schedule, it should be completed, along with 300 feet of southerly crosscut, by July, engineers estimate. This work should permit a sectional view of structures which contained lead-silver mineralization on the upper horizon. R. W. Greenough is president of Atlas. The project is being financed by *Hecla Mining Company, New Jersey Zinc Company,* and *Newmont Mining Corporation.*

Sidney Mining Company, operating in the Pine Creek district of Idaho, plans to deepen its shaft 200 feet and open a new No. 15 level. About 3,000 feet of westerly drifting is planned to explore a mineralized shear zone intersected by 1,500 feet of northerly crosscutting from the No. 5 level. W. T. Simons of Kellogg, is president.

Gibbonsville Mining and Exploration Company at last report was processing 100 tons of river tailing daily in its new lead-zinc-silver flotation plant west of Kellogg, Idaho. Plans called for stepping up operations to 400 tons daily. E. E. Eddy is general manager; Frank Eichelberger, consulting metallurgist.

Idaho Mining Company is planning to start deepening the shaft at its *Moon Creek* property, northeast of Kellogg, Idaho, from the 300 level to the 500 level early in June. Meanwhile, pumping facilities are being improved, timber framing equipment readied, and the dry modernized. About 800 feet of drifting on the 300 level has been completed under a $123,738 DMEA exploration program. A three-man crew, using Atlas jack-leg drills and Swedish drill steel, averaged more than 15 feet daily on a one-shift basis by alternating between four headings. Surface facilities have been mechanized to the extent that two men can handle hoisting and dumping of 70 tons of muck besides doing maintenance and shop work and handling materials for underground workers. Bruce E. Allgaier is secretary-treasurer and manager.

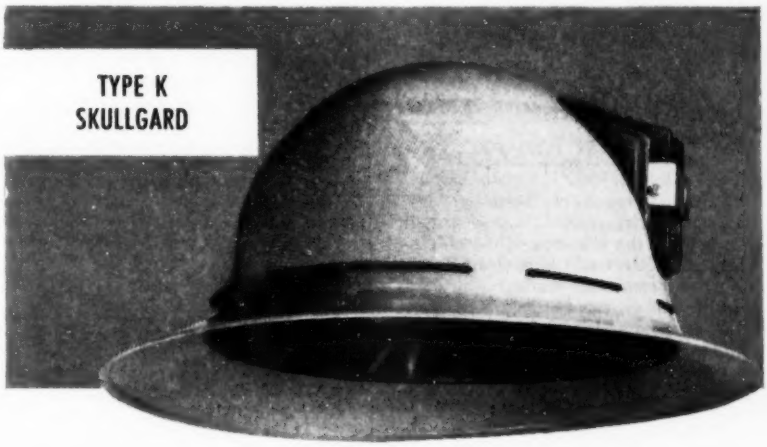
Pearson Mining Company of Wallace, Idaho is distributing liquidation assets. Shareholders will receive one share of stock in *Silver Ridge Mining Company,* a British Columbia firm, and 10 cents in cash for each share of Pearson company stock held. Margaret Featherstone of Wallace, is secretary, and Harry F. Magnuson of Wallace is president.

Bunker-Chance Mining Company has offered 1,000,000 shares of capital stock at 10 cents each to help finance its current $152,530 DMEA lead-zinc exploration contract. Recent new construction includes a compressor house and miners' change room, office building and storage quarters. Mining equipment purchased includes a mucking machine, trammer, air compressor and five ore cars. The old Butler adit at the property at Wardner, Idaho, in the Coeur d'Alene mining district, has been rehabilitated and some tunneling completed. It is proposed to spend $47,500 for crosscutting and drifting, $20,078 for buildings and equipment, $6,600 for diamond drilling, and $5,821 for miscellaneous supplies. Robert M. Gammell is mining engineer in charge. T. L. Hume of Portland, Oregon, is company president, and Milton C. Levin of Tigard, Oregon, secretary-treasurer.

Aberdeen Idaho Mining Company is preparing a public stock offering of 100,000 shares at 15 cents each to finance exploration at its 24-claim property in the Elk Creek area east of Kellogg, Idaho. The property is to be developed from the 3,500 level of the nearby *Sunshine Mining Company's* Jewel shaft. A northwest crosscut has been driven 1,000 feet from the Jewel toward the Aberdeen property. Sunshine has an economic interest in the group.

Whitedelf Mining and Development Company is exploring a vein of silver-lead ore crosscut 130 feet northwest of the shaft station on the new 800-foot level of the *Whitedelf* mine near Clark Fork, Bonner County, Idaho. The discovery was in the faulted section of the Pearl vein, south of the Pugh fault, and about 1,000 feet from the anticipated downward extension of the main north ore body. Compton I. White Jr. is manager. The firm has added a third hoisting shift to help handle muck from a loading machine in use on the new 800 level.

Polaris Mining Company reports "considerable success" in exploration for extensions of known oreshoots and additional ore bodies in the *Omega* and *Rotbart* areas by *Sunshine Mining Company* during 1952. "Very high-grade ore" was reportedly opened on the 3,700 level in one of the Polaris footwall veins, and the same structure yielded ore on the 3,400 and 3,250 levels. These holdings are in Shoshone County. The company has



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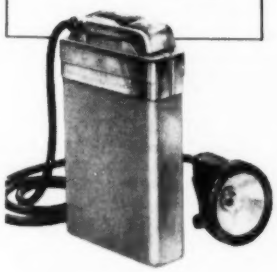

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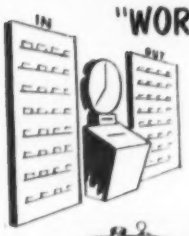

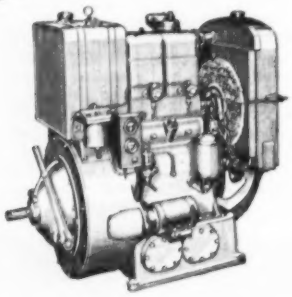

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also boosted hoisting capacity at its *Silver Summit* mine from 25 tons an hour to between 85 and 90 tons through installation of a new 600-horsepower double-drum hoist. The mine is at Osburn in the Coeur d'Alenes.

MONTANA

U. S. Gold Corporation plans to improve the ventilation system as its property near Twin Bridges, Montana and to install a portable air compressor. Plans for resumption of development work following a winter shutdown also call for extending the lower level adit from 400 to 600 feet to intersect a structure which yielded considerable production in old upper workings. The tunnel was pushed 400 feet in 1952. F. T. Wettrick, Seattle, is president, and W. E. Cullen, Spokane, secretary-treasurer.

Montana Standard Mining Company, Ltd. of Wallace, Idaho, plans to reopen its underground workings 12 miles west of Thompson Falls, Montana, for examination by an interested party. Directors have advanced funds to start the work and have levied an assessment of 1 cent a share. The main adit is 2400 feet long. Shipping grade lead-silver ore was shipped years ago. Loy L. Vose, of Wallace, is president.

Reopening of the *Essey* and *Locust* gold and silver mines near Melrose, Montana is planned by Frank McKinney of Butte, whose father formerly operated the properties. Patented in 1900, the properites were closed by litigation for many years.

Clinton Mayo of Butte, Montana reportedly has obtained a lease from the *Anaconda Copper Mining Company* on the *Clinton* mine, two miles east of Meaderville on the western side of the Continental Divide. He plans to open up the long caved adit in order to reach copper and zinc ore which is shown on Anaconda's geologic maps of the property.

W. R. Wade and H. G. Obendorf, operating as the *Ottawa Tungsten Company* have received a $47,600 DMEA contract to prospect for tungsten in Lewis and Clark County, Montana. The government's participation in the project will be to the extent of $35,700.

Hugh G. Nicley of Anaconda, Montana and Jacob Schneider of Philipsburg have obtained a 75 percent DMEA loan to explore for managanese at the *White Horse* mine in the Philipsburg district. Approximately $3,000 will be spent in rehabilitating and extending underground workings.

Western Montana Exploration and Development Company of Missoula, Montana, has retained Frank Eichelberger, Spokane consulting engineer, to assist Francis A. Hancock, resident engineer, in further development work and construction of a combination sink float-flotation plant now being laid out by Wilmot-Engineering Company of Hazleton, Pennsylvania. The mill will treat zinc, lead, copper ores of the Wasa-Shamrock claims, 10½ miles southeast of Hall, Granite County. Dr. Roy W. Key of Missoula, is company president and general manager.

OREGON

A chromite mill is being built on the mouth of Sixmile Creek west of Selma, Oregon, by Paul H. Floyd, Jean W. Pressler, and Roy S. Jackson, operating as the *Sixmile Chromite Company*. Mr. Floyd and Mr. Pressler were formerly with the U.S. Bureau of Mines' Northwest Electro-development Laboratory at Albany, Oregon.

Fred Langley and Claude Dean of Grants Pass, Oregon are driving a lower adit at the *Big Bear* chromite mine on Slate Creek to intersect an ore lens exposed in the floor of the original workings at 75 feet higher elevation. More than 200 tons of chromite have been mined from the original adit and stope.

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Old dumps of *Oregon* chrome mine west of Selma, Josephone County, Oregon, are being hand-sorted for chromite by Doyle Compton and James Gallaher of Grants Pass. Their first six-ton shipment was made after 10 days' work.

Oregon has 48 active chrome mines and 13 chrome concentrating plants, according to a directory of Oregon mines issued by the Oregon State Department of Geology and Mineral Industries. Only two gold lode mines and 12 gold placers were active last season, the report states. Five mercury mines were active in Oregon last year.

WASHINGTON

Silver content of lead-zinc ore at the *Longshot* mine northeast of Colville, Stevens County, Washington is permitting milling of about 40 tons of ore daily despite low lead-zinc prices. Development ore has been running between 10 and 15 ounces of silver per ton. Initial smelter shipments of concentrates from the new flotation plant constructed during the past winter were: lead concentrate, 60.85 percent lead and 235 ounces silver per ton; zinc concentrate, 47 percent zinc and 36 ounces silver. Darrell A. Newland of Colville, is president and general manager of the operating *Pioneer Mining Company*.

A 1,400-foot shaft is planned by *American Zinc, Lead and Smelting Company* on its holdings adjoining the *Grandview* lead-zinc mine near Metaline Falls, Pend Oreille County, Washington. Extensive diamond drilling has indicated substantial ore reserves. Dale I. Hayes of Spokane, is manager of the company's western mining operations.

Index Mining Company has received a $115,000 DMEA contract to explore for copper in Snohomish County, Washinton. The government's share in the project will be $57,500.

Pacific Northwest Alloys, Inc., a subsidiary of *Chromium Mining & Smelting Corporation* of Chicago, has received orders from the General Services Administration to cease production of magnesium. This is one of five plants being closed across the country. The cutback is being made as a result of a review made by the Munitions Board of current and future requirements.

Anaconda Copper Mining Company has relinquished an option to buy the *Gold King* mine, at the outskirts of Wenatchee, Washington, after 2½ years of exploratory work. Ed Lovitt, who turned the long-abandoned property into one of the state's leading gold producers, is currently producing 150 tons of ore daily.

Earl B. Gibbs of Colville and Ira M. Hunley of Spokane have resumed their former operation of the *Bonanza* lead mine in Stevens County, Washington. *Anaconda Copper Mining Company* turned the property back to them recently. Anaconda took a $2,000,000 purchase option on the property two years ago when it was Washington's largest and richest lead producer. Gibbs and Hunley received a $500,000 down payment and were to receive 12 percent of smelter returns or $25,000 a year until the balance was paid.

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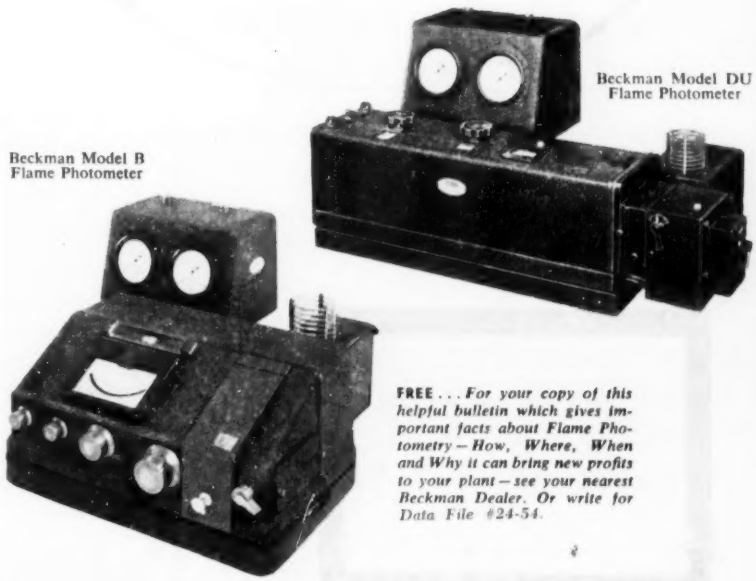

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NEW OWNERS OF LINKA TUNGSTEN MINE TO SINK SHAFT AND CONSTRUCT MILL

After four months of surface development and diamond drill exploration work, the California Tungsten Corporation has taken up its purchase option on the Linka tungsten mine in Lander County, Nevada. The company made its first payment to the owners of the lease, the C & C Tungsten Mining Corporation, and have started to sink a three-compartment shaft. Plans are also underway for a concentrating mill with a daily capacity of 100 tons.

The Linka property consists of four claims located about 20 miles east of Austin, adjoining the Conquest tungsten mine of Gale Peer. The claims cover many exposures of tungsten ore along a limestone-granite contact. During World War II, Mr. Linka and sub-lessees mined ore from two open pits and hauled the ore to the government purchasing depot at Battle Mountain, a distance of about 100 miles.

In December 1951, the C & C Tungsten Mining Corporation optioned the property. Jay A. Carpenter, president of the firm, and James P. Hart, treasurer, personally worked on the property surveying, sampling, improving the surface showings, and making small shipments of ore. Mr. Carpenter and Mr. Hart had been classmates at the University of Nevada in 1907. Mr. Carpenter retired as director of the Nevada Bureau of Mines and the Mackay School of Mines in July 1951.

Their development work attracted the attention of examining engineers. Mr. Carpenter offered the privilege of four months' exploration work without payments to prove up the property. It was during this time that California Tungsten Corporation carried out an expensive exploration program, and enough ore was outlined to justify construction of a mill.

President of California Tungsten which makes its headquarters in Salt Lake City, is Edward G. Frawley. Mr. Frawley is also president of the Consolidated Uranium Mines Company. Roy A. Hardy is consulting engineer of California Tungsten.

Development Continues At Old Dick Property

A new double-drum electric hoist has been installed at the Old Dick mine to replace the gasoline hoist, and development work is continuing although production from stoping has been suspended because of the low price of zinc. About 30 tons of ore per day are being mined from development work and shipped to Deming, New Mexico, for treatment. The company is said to be considering the erection of a mill at or near the property.

The two-compartment shaft is complete to the 400-foot level. This will serve as the main ore hoisting shaft and will be equipped with skips to replace the present car caging system. The ore body has increased both in size and grade with depth and the mine now has a very considerable ore reserve. Further deepening of the shaft is planned.

The Old Dick is operated by Manhattan Consolidated Mines Development Company. J. F. McColloch is president.

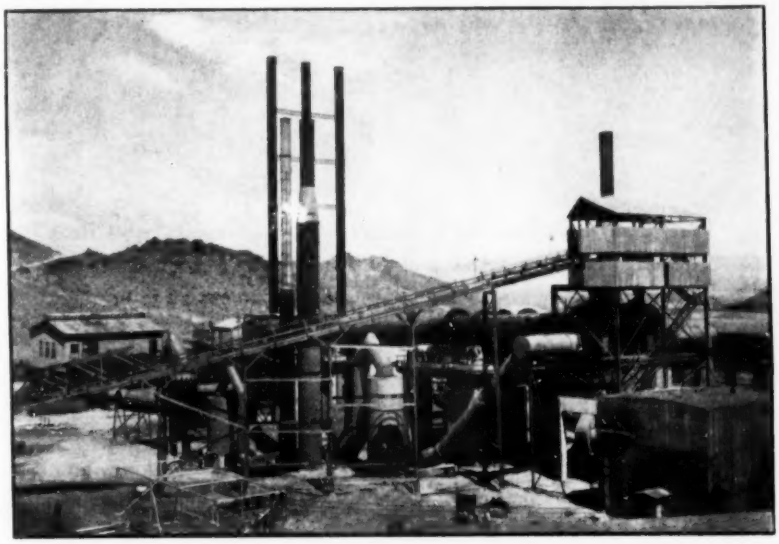
ARIZONA

Churn drilling at the *Mineral Park* porphyry copper deposit has been started by Tom Chapman of Kingman, Arizona, and associates. The first drill hole will be drilled near the Ostrich shaft of the *Kay* holdings where water level is said to be down only 20 feet. The Mineral Park deposit is located in the Cerbat Mountains about 18 miles from Kingman; several groups of claims, covering a considerable area, have been consolidated for the new drilling program.

W. F. Stephan of Parker, Arizona, owner of the old *Billy Mack* gold mine, has set up a small mill at the mine. He is making test runs to determine whether a profit can be made from running ore from the old dump for gold recovery.

Lester Fernstrom, who has been mining and milling tungsten ore from *Las Guijas* mine at Arivaca, Arizona, is erecting a new mill about a mile from Arivaca. Shortage of water was given as the reason for mill construction at the new location.

Work is being done by *Bagdad Copper Corporation* of Bagdad, Arizona, in preparation for the proposed expansion program which will more than double the company's present production capacity. The expansion program calls for additional water development by means of a storage dam on Burro Creek, enlargement of the mill, use of 60-ton trucks in the pit, Fluo-Solids roasting and electro-winning facilities, and additional



MANGANESE, INC.'S KILNING SECTION

The kilning section of the Manganese, Inc. mill near Henderson, Nevada will soon resume operations after being closed due to failure in the jacket of the large nodulizing kiln (shown in the background above). Fracturing occurred at one end of a long unsupported span between trunnions, causing considerable damage to the steel and concrete supporting structures. A double purpose is served by the 10- by 150-foot nodulizing kiln. Nodules of 45 percent manganese oxide are produced for shipment as metallurgical grade material, and lead (occurring in amounts of about 1 percent in the crude ore intimately associated with the manganese, probably as a rare lead-manganese mineral) is fumed from the manganese concentrate. Fumed lead is condensed, along with contained water, in the condenser and collector system in the left foreground, and later separated from the water in settling tanks. Lead concentrate averages about 55 percent lead and is shipped to various western smelters for reduction. Manganese concentrate from the flotation section of the mill has been stored during the kiln breakdown, enabling the nearby Three Kids mine—the source of the ore—and the crushing, grinding, and flotation sections of the mill to continue normal operations.

housing for employes. A new P & H 1,600 all-electric shovel was received in April, and two of the large trucks were delivered early in May. The road from Hillside to Bagdad is being improved, with completion expected within two months. Bagdad is regularly mining and milling about 100,000 tons of ore per month, and employs a mine crew of approximately 300 men. Ernest R. Dickie is general manager; Gaylen Guest, mill superintendent; Olaf Hondrum, mine superintendent; and George Colville, chief engineer.

Sherwin F. Kelly Geophysical Services, Inc. of Wilmington, Delaware is the organization making a complete geophysical survey of a part of the properties of *Banner Mining Company* near Tucson, Arizona. Banner took over the *Mineral Hill* and *Twin Buttes* properties in the Pima Mining District two years ago and did exploratory work in 1951 under a DMEA contract.

Harry Scott, William Scott, and Raymond Vinck have a $14,000 DMEA contract to explore for asbestos in their *Indian Springs* asbestos mine, 14 miles east of Globe, Arizona. The loan will be used to explore the width and depth of their orebody.

Miami Copper Company and its wholly owned subsidiary, *Castle Dome Copper Company*, produced 50,269 tons of copper during 1952, a slight decline from the output of 1951. Molybdenum output totaled 550,665 pounds. Net profit was $2,632,723, compared with $3,069,842 in 1951. The company's operations are at Miami, Arizona.

The *Ace Building & Roofing Supplies* have received a $23,840 DMEA contract to explore for manganese in Greenlee County, Arizona. The government's share in the venture will be $17,880.

About 50 tons of copper ore are being mined and shipped each week from the *Stevens Lease*, operated by Charles E. Stevens of Clifton, Arizona. Stevens holds a five-year lease on the property, located about nine miles north of Clifton, from the *Phelps Dodge Corporation*. Most of the ore produced is shipped to the *International Smelting Refining and Mining Company* at Inspiration, and is said to average about 5 percent copper. Stevens employs seven or eight men in the work and hopes to increase his production in the very near future to 100 tons weekly by the use of improved mining methods.

American Smelting and Refining Company reports that to the end of 1952, $5,490,000 had been expended at its *Silver Bell Unit*, northwest of Tucson, Arizona, in preparing the mine for production. The principal expenditures have been for stripping the ore body and for construction of the mill and townsite. The total cost of bringing the Silver Bell to production is estimated at $17,000,000. Production is expected to begin in the second quarter of 1954 and will be at the rate of approximately 18,000 tons of copper annually. D. R. Purvis is superintendent.

An additional water supply for the *Morenci Branch, Phelps Dodge Corporation*, Morenci, Arizona, is expected to become available this summer with the completion of a storage reservoir on Show Low Creek a tributary of Little Colorado River. The project also calls for the construction of a pumping plant and about a mile of pipeline to divert water from the reservoir to the Salt River watershed. The storage reservoir is located in southern Navajo County, Arizona, approximately 200 miles east of Phoenix and 100 miles north of Morenci. As water is delivered from the reservoir into Salt River, an upstream diversion of a corresponding quantity of water will be made by the corporation at its pumping plant on Black River, one of the principal tributaries of the Salt, for use at Morenci. It is estimated that the project will add an average of approximately 4,000 acre feet of water per year to the present water resources of the Morenci Branch. The estimated cost of the project is $1,750,000, of which $879,000 has veen expended prior to January 1, 1953.

The *U.S. Atomic Energy Commission's* branch exploration office in Phoenix reports that four firms are interested in purchasing monozite. They are the *Rare Earths, Inc.*, of Paterson, New Jersey; *Maywood Chemical Works*, Maywood, New Jersey; *Lindsay Light & Chemical Corporation*, West Chicago, Illinois; and *National Carbon Division* of *Union Carbide & Carbon Corporation*, New York.

Some ore deposits worthy of systematic exploration still exist in the old *Yellowjacket* gold camp in western Lemhi County, Idaho, according to a report of the Idaho Bureau of Mines and Geology. Copper and lead recoveries may be economically feasible because of gold content of the ores, it is said.

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The Defense Materials Procurement Agency's contract with *Southwestern Engineering Company* of Los Angeles, California for the extraction of manganese from low-grade ores has been amended to include research on wad ores of Arizona and New Mexico. The firm is already conducting studies on low-grade ores of Virginia and Arkansas, and from the Aroostook manganese deposits in Maine.

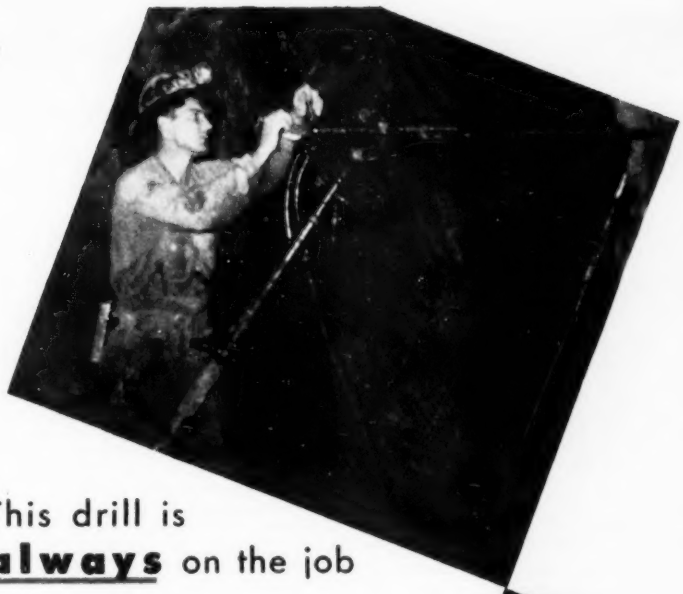
The large government-owned plant at Manteca, California, operated by *Kaiser Magnesium Company*, will be closed down by order of the General Services Administration. The plant was one of six reactivated in 1951 to meet critical stockpiling and other defense needs for magnesium. The Munitions Board, after a review of current and future requirements, recommended a cutback in production. Five of the six plants will be closed. Only the largest government-owned plant at Velasco, Texas will remain in operation.

Control in *H. W. Gould & Company*, mining and metallurgical engineers of San Francisco, California, has been purchased by Malcolm B. Gould. This company has been engaged in general mining practice for 30 years in the western United States, Central and South America. The late H. W. Gould, founder, was a leading figure in the quicksilver industry. Among the mines formerly operated by the company were *New Idria, New Idria Alaska, Klau, Oat Hill, Mt. Tobin, Wild Horse*, and others. Design, installation, and operation of the Gould rotary furnace was also one of the most important functions of the organization. In more recent years, interest has broadened to include gold, base metals, and fluorspar. Last year, *Kaiser Aluminum & Chemical Company* purchased the *Baxter* fluorspar mine east of Fallon, Nevada from H. W. Gould & Company. Bruce A. Gould, president of the firm since 1950, has retired and Malcolm B. Gould will be the new president.

The *Kate Hardy* gold mine in the Alleghany district of California has been sold by the O'Donnell family to Harold Huhn. Mr. Huhn is reported to have also purchased the *Rio* mine recently from Mike Connell.

Gold fever gripped the famed Mother Lode country of Nevada County, California last month when a rich strike was reported on land owned by Ralph Fuhr. Two lessees, John Neeley and Arthur Wright of Vallejo, were diamond drilling on an iron ore deposit. The first core reportedly assayed $124.950 per ton. Other cores from nearby holes indicated values of $3,075 per ton. Hundreds of people rushed to the scene after publicity was released; however, Mr. Fuhr commented that "there is hardly a mine in Nevada County that hasn't got a sample at least that good. That doesn't mean you're going to find that value over a large area."

Pierce Brothers of Morro Bay, California have started to mine the *Stevens* claims near the *Castro Chrome* property at San Luis Obispo. The present chromite shipping rate is 35 long dry tons per week on 1½ shifts per day opera-



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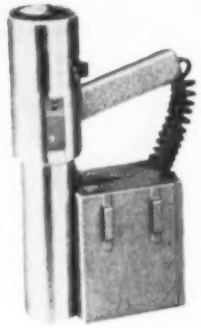

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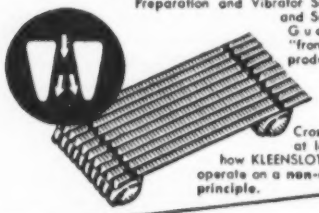

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tion. An Ellis type mill with two tables is in operation.

Anaconda Copper Mining Company obtained a lease and option on the *Santa Rosa* property located near Darwin in Inyo County, California. Development of this property is being continued. The mine has been an active lead-copper-silver-gold producer over the years, and in 1943 the *Santa Rosa Mining Company* reported that the mine had a production record of over $1,100,000. In 1950 the property was leased to R. M. Palmer who shipped 100 tons of ore per month for some time.

Deep workings in both *Empire* and *North Star* gold mines of the *Empire Star Mines Company, Ltd.* at Grass Valley, California have been abandoned and are filling with water. This abandonment contributed to a decrease in ore reserves at the end of 1952 from an estimated gross value of $6,067,000 at December 31, 1951 to $5,935,000. Short range development work and diamond drilling are being carried on in an effort to offset depletion of reserves of ore being mined by the company as well as by lessees.

NEVADA

The *M.I.A. Mines Company* has been awarded a $171,400 DMEA contract to explore for tungsten in White Pine County, Nevada. The government's participation in the project is $128,550.

Fred Hess has made an ore strike in the old *Ophir* pit near Virginia City, Nevada. Working under a lease arrangement with Zeb Kendall who controls the entire "North End" group of famous *Comstock* mines, Mr. Hess struck ore in the bottom of the Ophir open pit which had been developed by previous operators. The ore is essentially silver, with some gold, copper, lead, and iron.

Tonopah Development Company is sinking a winze on the 300-foot level at its *Summit King* mine north of Tonopah, Nevada. Plans call for drifting and raising in the underground workings. The winze is expected to strike the orebody at greater depth. A large body of silver-gold ore was outlined last year. *Calumet & Hecla, Inc.*, owns the property which is leased to the *Homestake Mining Company* and *Summit King Mines, Ltd.* who are participating jointly in the operation as Tonopah Development Company.

All equipment and buildings of the *First Uranium Corporation of Nevada, Inc.* located at Imlay and nearby Majuba, Nevada, were to be sold by order of the Sixth Judicial Court, following a successful suit of three mine employees and the state labor commissioner for unpaid wages. An expensively equipped mill, mill building, four power plants, various miscellaneous machinery, and other buildings were to be sold, along with equity in the *Majuba* mine. Legal owners of the claims are Mr. and Mrs. E. J. Myler.

Work has started on construction of the $665,186.10 U.S. Bureau of Mines rare and precious metals experiment station in Reno, Nevada. The building, to be completed within one year, will adjoin the campus of the University of Nevada.

NEW MEXICO

International Minerals & Chemical Corporation has installed a new central lamp house at its potash operations near Carlsbad, New Mexico. Located at No. 1 shaft, lamps from all areas will now be serviced here. Formerly, lamps used by men at the No. 2 shaft were serviced at the No. 2 house, while lamps for the No. 3 shaft were brought over to the old No. 1 shaft lamp house. With the new No. 4 shaft scheduled for operation soon, the central station will have another advantage.

Kerr-McGee Oil Industries, Inc., which purchased the mines and equipment of the *Navajo Uranium Company* in 1952, is conducting engineering investigations to determine the feasability of erecting a uranium-vanadium plant in the Shiprock area of northwestern New Mexico. Both the United States Atomic Energy Commission and U.S. Bureau of Mines have been conducting metallurgical tests on ores from the district now stockpiled at the AEC buying depot at Shiprock. Kerr-McGee also operates uranium mines in Arizona's Lukachukai Mountains.

Phelps Dodge Corporation earned $9,400,000 during the first three months of 1953. Earnings in 1952 totaled $35,026,550, after deductions for depletion of mines. The mines produced 226,584 tons of copper, or about 25 percent of all copper production in the United States. Operations at the United Verde Branch in Arizona were discontinued on March 23 due to lack of ore reserves. Drilling results have been encouraging at the Burro Mountain Branch at Tyrone, New Mexico. Drilling has been to develop a low-grade copper ore body that can be mined by open-pit methods.

Selected shipment of copper and lead ore are now being made from the *Conqueror* mine of the *New Mexico Copper Corporation* near Carrizozo, New Mexico to the smelters at El Paso. Sixty-ton cars carrying fluorspar ore began moving to the mill of *General Chemical Company* at Deming a week before. Other ore containing fluorspar, in addition to lead and copper, is being stockpiled to be milled later by the company which plans to erect its own mill. The presence of molybdenite has been indicated and ore is now being tested to determine the best method of extraction.

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NEWMONT'S SUBSIDIARY IDARADO CO. PLANS TELLURIDE MINES PURCHASE

Newmont Mining Corporation's subsidiary, Idarado Mining Company, has made plans to acquire 100 percent of the capital stock of the Telluride Mines, Inc. Newmont owns 74.2 percent of Idarado, Mine and Smelter Supply Company owns 15.8, and Homestake Mining Company 10.0 percent. Idarado operates the Treasury Tunnel-Black Bear mines in Ouray and San Miguel counties, Colorado; it was the state's largest gold, silver, and copper producer and second largest lead and zinc mine.

Telluride Mines, operator of the famous Smuggler Union and other mines, publicly announced that it was closing on May 15 due to continuing unprofitable operations caused by low lead and zinc prices. Shortly after the announcement, Oscar Johnson, Idarado president, started negotiations for purchase of Telluride Mines.

The transaction would be a logical step since Idarado already controls a large group of claims on three sides of Telluride holdings, and has developed a large tonnage of mill-grade gold-silver-lead-zinc-copper sulphide ore. Idarado's Treasury Tunnel mill in Ouray County is being operated at capacity so the recently enlarged 900-ton-per-day Telluride differential flotation mill can be used by Idarado for milling both Telluride ore from the Montana vein and Idarado ore from the Ajax, Argentine, Black Bear, and other veins. Idarado's development through the Meldrum and Bob Cat tunnels gives 1,000 feet of backs on these veins below the main Treasury Tunnel level through which Idarado mined 259,543 tons of ore in 1952. These tunnel portals are at a higher elevation than the Telluride mill and only one-half mile away.

As a prelude to the purchase, Local 13187 United Mine Workers of America agreed to a new contract and signed it with Idarado covering working conditions and pay rates. J. W. (Bill) Nelson represented Idarado at the signing.

AEC Tells Improvements In Sampling Procedures

A followup report has been issued by the Grand Junction (Colorado) Operations Office of the United States Atomic Energy Commission on improvements made in uranium ore sampling procedures since the release of a highly critical report in January by the Colorado School of Mines Research Foundation.

Specific correction steps taken by the companies include: Climax Uranium Company—Making a 10 percent primary cut of the lots of ore and filling in corners of bucket elevator boots to facilitate cleaning; United States Vanadium Company—At the Rifle, Colorado plant, taking a 20 percent sample at regular intervals, using a Vezin sampler to take a secondary cut of 10 percent, and confining use of coffee mills and Jones splitters to the sample preparation department; At the Uravan, Colorado plant, elimination of chain bucket elevator as sample cutter, installation of a 60-inch Snyder primary sampler cutter with crushing rolls and belt feeder conveyor and a secondary Snyder sampler, alteration of bucking room and minor adjustments of chutes. At the Thompsons, Utah plant, installation of rolls, ore feeders and Vezin samplers, enlargement of conveyors; Vanadium Corporation of America—Alteration of primary crushing machinery to give a minus-½-inch product, improvement of conveyor system to make 20 percent cuts of primary crusher discharge, followed by two additional 10 percent cuts by Snyder samplers, use of cone crusher to reduce split to 1-inch before manual splitting and transfer to sample preparation facilities.

Sheldon P. Wimpfen, manager of the Grand Junction Operations office, said the AEC would continue to study sampling procedures and that sampling stations would be expected to adopt "refinements" for further efficiency and accuracy.

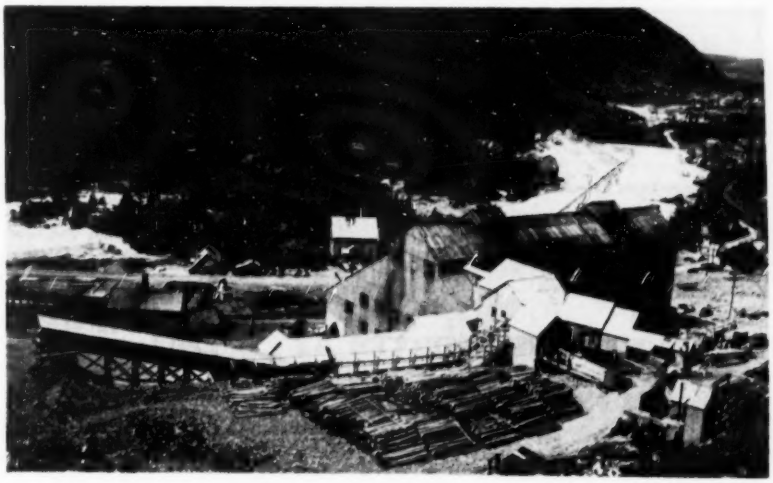
COLORADO

The *American Smelting and Refining* company has started construction of a 200-ton-per-day differential lead-zinc flotation mill at its *Keystone* mine in Gunnison County, Colorado, using equipment from its *Mike Horse* mine in Montana for the most part. The company continued its underground exploration program on two veins in the Keystone during the winter and recently signed a power contract with the Rural Electrification Authority. Development work carried on for the past two years has blocked out a moderate tonnage of mill grade lead-zinc-copper-silver sulphide ore, according to F. V. Richard, manager of operations for ASARCO's western mining department and director of the Keystone project.

Sprague & Henwood, Inc. recently was awarded contracts for 270,000 feet of diamond core drilling to explore for uranium ore in the Colorado Plateau area. Camp peparations have already begun at Slick Rock, Colorado for this project. A western branch office will soon be opened in Grand Junction, Colorado, to accommodate the heavier volume of business.

Spokesmen for the *U. S. Atomic Energy Commission* have indicated that the AEC has no objection to the Johnson-Milliken bill, now in the U.S. Senate, providing that the authority of the Secretary of the Interior to withdraw lands on which the AEC itself is prospecting for uranium is left unimpaired. The bill arose out of the current conflict between the uranium mining industry and oil and gas interests in the Colorado Plateau, and is designed to clarify the titles to claims filed by miners on lands held under prior oil and gas leases. William Mitchell, general counsel of the AEC, and Rafford L. Faalkner, acting director of the commission's division of raw materials, told the U.S. Senate Interior and Insular Affairs committee's sub-committee on mining that their agency was interested solely in developing uranium resources within the borders of the United States and that it was immaterial to them whether the uranium ores came from leases or claims. Spokesmen from the Bureau of Land Management said no decision had been reached

Telluride's mill, tailing pond, and office buildings—looking west toward town.



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and that the bill was still under study. Representative Wayne Aspinall has been pushing similar legislation concurrently in the House of Representatives. Meanwhile, Uranium Ore Producers Association has asked miners in the Colorado Plateau to supply detailed information on the extent of claims conflicts and will use the results of the survey at future hearings to show the necessity for immediate legislative action.

Newmont Mining Corporation is negotiating a long-term lease with B. T. Poxson and George Garrey for the 2,000-acre property of the *Summitville Mining Company* at Summitville Rio Grande County, Colorado. It is reported that extensive preliminary exploratory and development work is planned, and that Newmont is primarily interested in the copper potential of the old-time gold camp. Work is expected to begin as soon as the spring thaw is complete in the high mountain area.

Camp Bird Ltd.'s head office in London, England has pointed out that both development and production have been cut back to a one-shift-per-day basis at the *Camp Bird* mine in Ouray, Colorado because of the low level of base metal prices. The April issue of MINING WORLD incorrectly said that the mine had been closed.

A newly-installed roaster at the vanadium-uranium ore processing plant of *Vanadium Corporation of America* is now in operation and both this plant and the mill at Naturita, Colorado are operating at capacity. Addition of producing facilities and net sales increases are credited for a 20 percent increase over last year in net earnings for the first quarter. The company's net income after taxes and charges for the quarter was $819,204, as compared with $562,575 for the same period in 1952.

Mariposa Mining Company reportedly has leased the 25-ton-per-day mill of the *Bachelor Corporation* at Placerville, Colorado and will reconvert it to handle lead-zinc-silver-gold ore produced at the *Butterfly* mines near Ophir. The Bachelor mill was constructed in 1952 to treat uranium and complex base metal sulphide ores, and will be redesigned using flotation data and flow sheets made up especially for Butterfly ores by the Colorado School of Mines Research Foundation. Butterfly has about 2,000 tons of ore ready for milling and reportedly will be able to supply the required tonnage to keep the mill in full operation. Roscoe Riddle, superintendent of Bachelor Corporation, has been loaned to Mariposa for the period required to get the mill in operation, but Mariposa will operate the plant with its own personnel.

The *Defense Minerals Exploration Administration* has granted a loan of $37,000 to Mike Vinson, Pat Vinson, and Fred Harris for exploration at the *Chataque* mine near Montezuma, Colorado. The Vinson-Harris interests have leased the mine and mill from *Teller Basin Mining and Milling Company* for the past several years, and are now shipping about 300 tons of ore which reportedly has a "good" silver and a 20 percent lead content. The vein averages 30 inches in width. Government engineers surveying the property have advised drifting 1,000 feet on both the upper and lower mine levels and driving a connecting 200-foot raise between the two. Equipment at the mine has been supplemented by purchase of all of *U. S. Lead Corporation's* equipment except the compressor. The loan will be repaid from net production.

Colorado School of Mines and *Kennecott Copper Corporation* are planning to co-sponsor a special summer geology-geophysical session course at Aspen, Colorado to begin accumulative field investigation of the area. John L. Herron, who holds most of the Aspen district under lease, has given his permission to the school to conduct any survey or investigations deemed desirable, and has agreed to make available all early surveys and maps of the district.

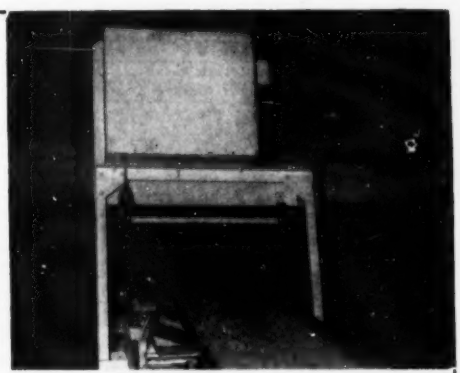
Climax Molybdenum Company has announced a net profit for the first quarter of $2,032,927, as compared with $1,063,828 for the same period last year. Arthur H. Bunker, president, said he expected molybdenum output to increase 50 percent this year and that government purchases for the stockpile and the usual civilian demand should provide an ample market for the next three years' production. Mr. Bunker also said that he expected dividend prospects to improve next year in view of the large investment which the company has been making in development. This year $9,000,000 will be spent.

Natomas Company has purchased all assets of the *South Platte Dredging Company* near Fairplay, Park County, Colorado, making it a wholly-owned subsidiary. South Platte, which was the only firm to resume its connected bucket-line gold dredging operations in Colorado after World War II, closed down January 15, 1952 due to inability to operate at a profit with the fixed gold price. Natomas, which formerly owned only half of South Platte, has announced no plans for use or operation of the property. It acquired the remaining half for $175,000.

The United States Geological Survey has published two papers containing pointers on use of maps and geological knowledge to find carnotite-bearing orebodies instead of hit-and-miss, expensive diamond drilling. R. P. Fischer and L. S. Hilpert are co-authors of "Geology of the Uravan Mineral Belt," and Doris Blackman Weir has written "Geologic Guides To Prospecting For Carnotite Deposits On Colorado Plateau." Both are obtainable at a nominal cost from the Superintendent of Documents, Washington 25, D. C.

The *C. & B. Mining Company*, owners of a molybdenum mine on Clear Creek in Chaffee County, Colorado, will cooperate with *The Western Mines, Inc.* in producing a new natural soil conditioner, magnite. The product will be produced and packaged in Denver from minerals mined in Colorado and Wyoming.

Harry King has leased the *Bard Creek* mine near Empire, Colorado and is installing mill machinery. Tantalum and uranium mineralization recently found on



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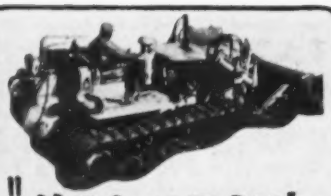

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A mica mining machine rental program is being set up by the General Services Administration at Custer, South Dakota. Air compressors, drills, hoists, loaders, bulldozers, and trucks will be furnished. If mica is found in paying quantities, the prospector must then provide his own equipment. The rental program is an adjunct of the government's mica stockpiling program.

Homestake Mining Company at Lead, South Dakota has installed a new vacuum cleaning system at the Yates crushing plant. Dirt, dust, and spillage from the conveyor belts will be picked up by the cleaning system instead of being swept and shoveled. The system is stationary, with the vacuum pump a nine-stage centrifugal driven by a 15-hp. motor. Separation of dust from air is achieved in two stages, each contained in a tank 30 inches in diameter and 60 inches high. The first stage is a centrifugal operation which removes coarse material up to ½-inch size. A group of bags then filter the remaining fine dust in much the same manner as a household vacuum cleaner. Special 2-inch hose fittings are located throughout the crusher room to accommodate hose nozzles. The separators are emptied periodically by direct pipes into the crushed ore bins underneath.

UTAH

United States Smelting, Refining & Mining Company has cut back operations from six to five days per week at its *U. S. Bingham* and *Lark* mines, at the *Ophir* unit, and at the Tooele County and Midvale plants. W. C. Page, vice president and general manager, said low lead-zinc prices necessitated the action, which affects approximately 1,100 employees in Utah.

A crew of 175 men resumed sintering operations recently at the Tooele, Utah lead-copper-zinc smelter of *International Smelting and Refining Company*, with the full payroll of 500 to be at work when the blast furnaces are fired. The plant was shut down January 1, 1953 due to a shortage of concentrates and ore, and the company has been stockpiling shipments since then. Company officials say that the plant will be able to operate for a full year under present conditions, and that the hoped-for change in lead-zinc price structure would assure operation beyond the 12-month period.

The *Defense Minerals Exploration Administration* recently granted three loans to Utah producers totaling $45,693. Willard Cleghorn received $9,177 out of $18,354 for lead exploration in Utah County. *Excalibur Uranium Corporation* received $34,410 of $38,233 to be used

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for uranium development work in Grand and Emery counties. Frank L. and Erma R. Morgan were granted $2,106 of the $2,340 which they will spend on uranium exploration in Emery County.

Dragon Consolidated Mining Company, producer of halloysite clay at Eureka, Juab County, Utah, reports its income for 1952 as $38,696.61 before deduction for depletion. Gross income was $792,472.65, while production totaled 60,917 tons of shipping quality clay. Of this, 23,658 tons were from open-pit operations and 37,264 were from underground. All output was sold to *Filtrol Corporation* of Salt Lake City, which is the company's sole sales outlet.

Frank Dean, superintendent for *United States Uranium Corporation*, reports the discovery of a uranium ore body in the Temple Mountain district of Emery County, Utah. The area is about 11 miles southwest of Temple Mountain in the Shinerump formation. Radiation measured after a bulldozer exposed outcropping reportedly indicated a U_3O_8 content of 0.20 percent and higher.

Stockholders of *Silver King Coalition Mines Company* and *Park Utah Consolidated Mines Company* have voted overwhelmingly for a proposed merger with *Park-Utah Consolidated Mines Company*. The new Park City, Utah firm will be known as *United Park City Mines Company*. Both companies are old-time silver producers which hope to gain added efficiency by pooling equipment, property and capital.

Shipments of non-carnotite uranium ore from the *Utex Exploration Company* at Moab, Utah have passed the 1,000-ton-per-month mark, with the company now the biggest shipper of uranium-vanadium ores to the purchasing depot at Thompson, Utah. The ore has been averaging about 0.58 per cent U_3O_8 and 1.87 percent V_2O_5. The orebody presently being worked is believed to be approximately 600 feet long and 35 to 40 feet thick in places. The rich uranium strike has been developed by Charles Steen, Utex president, without assistance from the U. S. Atomic Energy Commission or other government agency. W. T. Hudson, Utex vice president, reports that a second company of which he is president has just encountered about seven feet of "good" uranium ore at a depth of 260 feet in the same general Moab area.

Installation has been completed on a new underground hoist for the 1,800-foot level of the *Chief No. 1* mine of *Chief Consolidated Mining Company* at Eureka, Utah. The $93,000 hoist was installed in the 18/411 winze, which the company plans to deepen from its present 2,827-foot level to 3,100 feet. The new addition is a Vulcan-Denver double-cylindrical drum hoist with oil-operated post brakes for each drum. It has a 20,500-pound rope pull, and is capable of a vertical lift of 3,000 feet. The hoist's two drums are driven by two 200-h.p., 600-rpm, 2,300-volt motors, providing a rope speed of 1,000 feet per minute.

Western Gold Mines, Inc. has signed a contract with the U.S. Atomic Energy Commission to drill 300 test holes for uranium-vanadium ore at its *Silver Reef* silver-copper-sandstone mine near Leeds, southwestern Utah. Ralph G. Brown, president, said the exploration will be financed by an AEC loan to be repaid on a production royalty basis. Mr. Brown also said that shipments of "good" uranium-vanadium ore have been made for the past several months from the company's *Chloride Chief* claim.

Invitations for bidding have been issued by the *U. S. Atomic Energy Commission* for 40,000 feet of diamond drilling in the Montezuma Canyon Area of San Juan County, Utah. The lowest bidder will be required to furnish all specified labor, materials and services, as well as a deposit for 10 percent of the bid price and performance and payments bonds.

From 12,000 to 20,000 tons of low-grade lead-zinc-copper ore located near the No. 2 shaft of *Tintic Standard Mining Company's* property at Eureka, Utah will be removed by a private operator. Tintic Standard will receive 25 percent of the returns.

Moreno Cripple Creek Corporation reports completion of its second incline shaft on the *Snowflake* and *Sunflower* uranium-vanadium claims at Moab, Utah. Ray A. Bennett, president, said that 12 tons of ore recovered while sinking the shaft have been delivered to the AEC ore purchasing depot at Monticello, Utah. Ore chutes are being installed in both inclines to aid shipping.

Garfield Chemical and Manufacturing Company has half completed the expansion of its sulphuric acid plant near Garfield, Utah. When finished, the expansion will increase capacity 250 tons per day to a total of 750 tons. Garfield Chemical is a joint affiliate of *American Smelting and Refining Company* and *Kennecott Copper Corporation*.

WYOMING

Intermountain Chemical Corporation's $20,000,000 soda ash mine and mill at Green River, Wyoming have been completed and are now in full production. C. A. Romano, resident manager, said planned capacity of the processing plant is 300,000 tons of soda ash per year. Mine production of trona will be 600,000 tons per year. The soda ash will be marketed by the *Westvaco Division of Food Machinery and Chemical Corporation*. Food Machinery is also Intermountain Chemical's parent company. The only other soda ash operation of any consequence in the West is located in California, where total output is considerably lower and is on a by-product basis.

The Colorado Fuel and Iron Corporation is investigating the possibility of installing a beneficiation plant at its *Sunrise* iron mine at Sunrise, Wyoming and has sent engineers to visit HMS plants in Minnesota. The Sunrise mine is the largest source of company-mined iron ore for the Minnequa steel plant at Pueblo, Colorado. A beneficiation plant would increase ore reserves, since Sunrise has been operated as an underground mine for several years following depletion of high-grade open pit ores. George Rupp is manager of the mining department and M. L. Sisson is Sunrise superintendent.

The E. C. Schroeder Company, Inc. of McGregor, Iowa is reported to have acquired iron ore claims near Sunrise, Wyoming. Schroeder is considering open-pit mining and erection of a beneficiation plant. The company is one of the largest independent Alabama iron ore miners and operates an HMS plant with a capacity of 60 long tons per hour at Isabelle Siding, Russelville, Alabama. E. C. Schroeder is company president.

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75	G.E.	MT	900*
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1—6 ton Goodman trolley, 36" gauge
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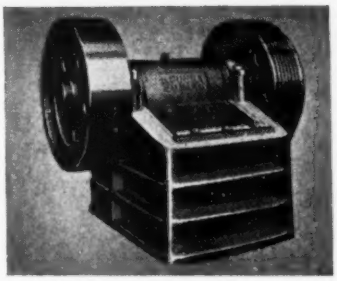

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FOR SALE: Used Bodinson washing plant for placer dredging. 100 yard per hour capacity. Mounted on steel pontoons. Electrically operated. Powered by Caterpillar D13,000 Diesel Electric set. Priced to sell. H. E. Brown, Grangeville, Idaho.

FOR SALE: 1-Cleaner cell and 4 rougher PAN-AMERICAN flotation cells, 24" x 24", without motors, with two reagent feeders. Gordon Estes, Battle Mtn., Nevada.

FOR SALE: Universal 2½ Ton Diesel Locomotive. 24" guage. Exhaust Gas Conditioner. Ready to go. Universal Dredge Mfg. Co., 124 Wazee Market, Denver, Colorado.

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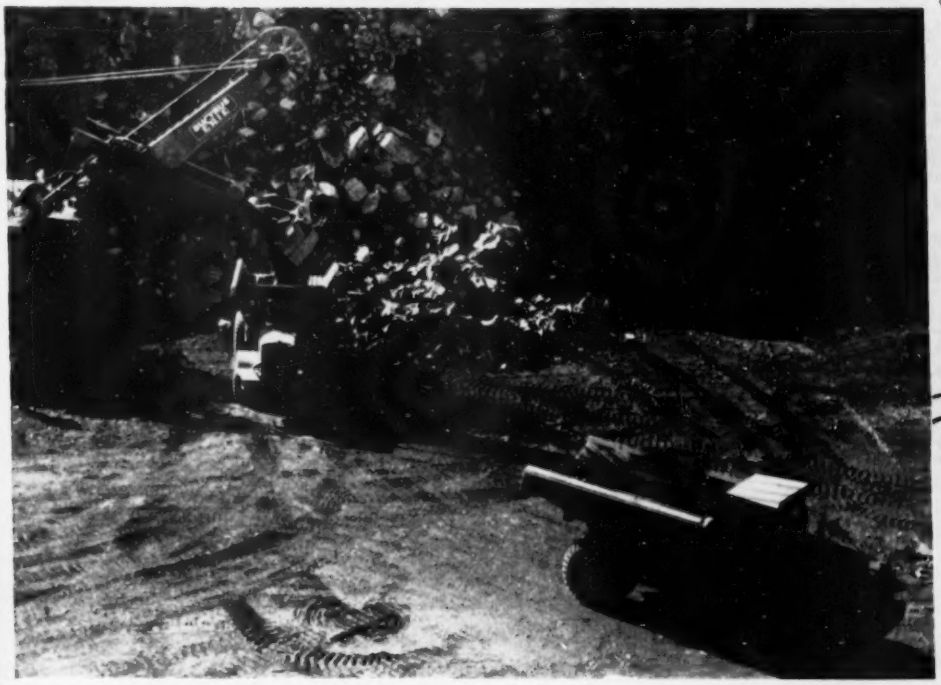
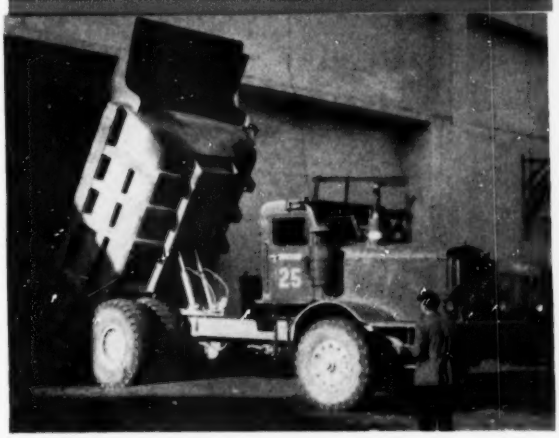


"Eucs"

Maintain 87% Job Availability at Norway Mine!



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Working 24 hours a day, 6 days a week, the year 'round, "Eucs" at Sydvaranger have averaged 87% job availability including time required for periodic servicing and installation of special equipment. They are loaded with iron ore and heavy overburden by a 4½ yd. shovel, and have a round trip haul of about 3½ miles.

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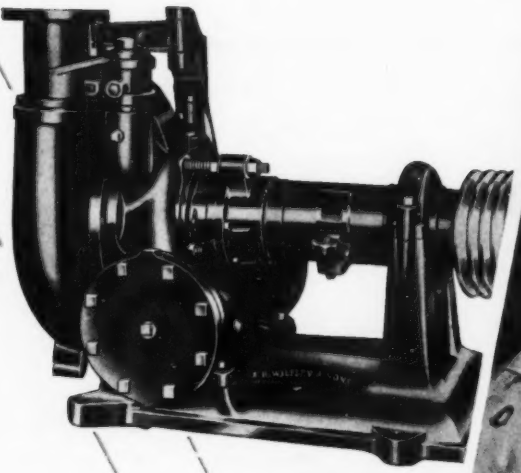

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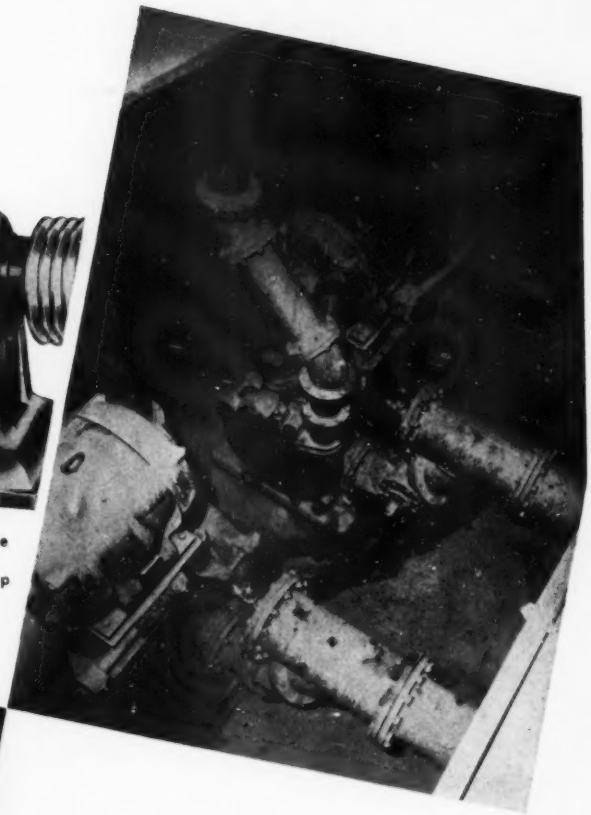

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